USER-DEFINED DYNAMIC COLLABORATIVE ENVIRONMENTS

This application is related in subject matter to and claims priority from provisional U.S. application serial number 60/101,431, filed on September 22, 1998. The contents of that application are bodily incorporated herein.

BACKGROUND OF THE INVENTION

1. Technical Field

This invention relates generally to computer systems and networks. More particularly, the invention relates to systems and methods for providing user-defined collaborative environments for transacting business or electronic commerce.

2. Related Information

Following hurricane Andrew, many insurance companies sought to limit their risk by withdrawing coverage from coastal areas. While this made good sense for the specific companies, it was not acceptable from a societal perspective. The cities, towns, homes and businesses built near the coasts could not afford to go without insurance, nor could the financial institutions that loaned money on these properties afford the risk. The problem facing the insurance companies was not the absolute magnitude of the risk, but the concentration of the risks in one area, leading to the possibility of very large losses resulting from a single event.

One law firm had conceived the idea of providing a mechanism for insurance companies to exchange risk. Companies with a high exposure in one area (e.g. Florida windstorms) could reduce their risk by ceding part of this to another company with non-coincident risk (e.g. California earthquakes) and assume part of the second company's risk in return. A company (CATEX) was formed to conduct such trading, but the trading rules had yet to be defined and the trading infrastructure had not yet been developed. CATEX postulated that the key barrier to insurance risk trading was determining the relative risk of different perils in different regions. One approach suggested by CATEX was to try to estimate these relative risks (termed relativities) for a broad set of perils and regions, to provide an initial basis for trading.

It was recognized, for various reasons, that this could not be done feasibly because: general estimates of risk, rather than the risk for specific locations, buildings, ships, etc. would be inadequate for commerce; there were many risks to evaluate given all of the permutations of

1 location, perils, and structure; and companies would not be willing to trade risk based strictly on

2 a third-party's analysis

3 An analysis of the problem, however, indicated that estimating the relativities was not

4 essential to facilitate trading, or, in a broader sense, that trading was the only way to address the

5 problem of insuring concentrated risk. The key difficulty was determining how to create greater

6 efficiency in the reinsurance market, whether by introducing new instruments (like swaps),

7 bringing new capital to the market, connecting more buyers to more traders, or reducing the cost

8 of placing reinsurance. It was determined that the above concept could be implemented in an

9 electronic trading system that could play an important role in promoting these factors, and could,

10 in fact, transform the reinsurance market, which is not very automated. A system that allowed

11 trading was developed and implemented. A more detailed description of this system, as

12 enhanced in accordance with various inventive principles herein (referred to as "first-generation"

13 complex instrument trading technology), are provided below.

14 More generally, as electronic commerce (and business-to-business commerce, in

15 particular) has grown, various companies have developed software tools and services to facilitate

16 transactions on the Internet and over private networks. E-Bay, for example, hosts a well-known

17 web site that operates a transaction model (a so-called "concurrent auction") that permits buyers

18 to submit bids on items offered by individuals. Lotus Notes provides a network-oriented system

19 that allows users within a company to collaborate on projects. Oracle Corporation hosts various

20 transaction engines for clients that pay to host such services on a web site. DIGEX Corporation

21 similarly hosts web-based application programs including various transaction engines. Other

22 companies sell so-called "shrink wrap" software that allows individuals to set up web sites that

23 provide catalog ordering facilities and the like.

24 Some Internet service providers, such as America Online, host "chat rooms" that permit

25 members to hold private discussions with other members who enter various rooms associated

26 with predetermined topics. A company known as blueonline.com hosts a web site that facilitates

27 collaboration on construction projects. Various virtual private networks have been created to

28 facilitate communication among computer users across the Internet and other networks, but these

29 networks provided very limited functionality (e.g., e-mail services); are not user-defined (they

1   must be created and installed by system administrators); and they cannot be easily destroyed

2   when they are no longer needed.

3   The aforementioned products and services are generally not well suited to facilitating

4   complex electronic transactions. As one example, most conventional services are predefined (not

5   user-defined) and are centrally administered. Thus, for example, a group of companies desiring

6   to collaborate on a project must fit their collaboration into one of the environment models

7   provided by an existing service provider (or, alternatively, build a custom system at great

8   expense).

9   Suppose, for example, that a group of high school students needs to collaborate on a

10   research paper that requires soliciting volunteers for a survey on drug use, conducting the survey,

11   brainstorming on the survey results, posing follow-up questions to survey participants

12   anonymously, publishing a report summarizing the results, and advertising the report for sale to

13   newspapers and radio stations. This project requires elements of communication among persons

14   inside a defined group (those writing the paper) and outside the group (e.g., survey participants);

15   conducting research (conducting the survey, compiling the results, comparing the results with

16   other surveys published by news sources; and brainstorming on the meaning of the results); and

17   conducting a commercial transaction (e.g., publishing the survey in electronic form and making it

18   available at a price to those who might be interested in the results). No existing software product

19   or service is available to meet the specific needs of this research team. Creating a user-defined

20   environment including tools and communication facilities to perform such a task would be

21   prohibitively expensive. Even if such a tailor-made environment could be created, it would be

22   difficult to disassemble the environment (computers, networks, and software) after the project

23   was completed.

24   In short, there is a need to provide a user-defined collaborative environment that is

25   tailored to the needs of particular groups that conduct communication, research, electronic

26   transactions, and deal-making.

27   **SUMMARY OF THE INVENTION**

28   A first embodiment of the invention, referred to as a complex instrument trading engine

29   (CITE), facilitates negotiation between two or more parties. In this embodiment, a set of

30   negotiation tools and techniques such as anonymous email, secure communication, document

1   retention, and bid and proposal listing services are provided in order to facilitate the negotiation

2   and execution of complex instruments such as contracts between corporations, governments, and

3   individuals.

4   A second embodiment of the invention, referred to as a dynamic collaborative

5   environment (DCE), allows members of a group to define a dynamic virtual private network

6   (DVPN) environment including user-selected tools that facilitate communication, research,

7   analysis, and electronic transactions both within the group and outside the group.   The

8   environment can be destroyed easily when it is no longer needed. Multiple environments can co-

9   exist on the same physical network of computers.

10   Although the two embodiments are described separately for ease of comprehension, it

11   should be understood that the two embodiments share many features and, in fact, the second

12   embodiment could include some or all of the features of the first embodiment in a generalized

13   collaborative system.   Consequently, references to a specific embodiment in the following

14   description should not be deemed to limit the scope of features or tools included in each

15   embodiment.   Moreover, references to specific applications, such as the reinsurance industry,

16   should not be deemed to limit the application of the invention to any particular field.

BRIEF DESCRIPTION OF THE DRAWINGS

18   FIG. 1A shows a four-step model of deal making including meeting, analysis, negotiation,

19   and closing the deal.

20   FIG. 1B shows contract formation among a group of parties to a contract.

21   FIG. 2 shows a listing display system showing all offers for contracts and responses

22   thereto.

23   FIG. 3 shows details of a listing that has been selected by a user.

24   FIG. 4 shows one possible implementation of a reply card definition screen.

25   FIG. 5 shows one possible implementation of a document management screen.

26   FIG. 6 shows one possible implementation of a screen indicating persons having access to

27   a shared folder.

28   FIG. 7 shows a list of consummated deals in the system.

29   FIG. 8A shows detailed information regarding a completed trade.

1   FIG. 8B shows a deal summary including structured and unstructured information

2   concerning the deal.

3   FIG. 9 shows a "flip widget" in a first state.

4   FIG. 10 shows a "flip widget" in a second state.

5   FIG. 9A shows a more detailed example of a "flip widget" in a first state.

6   FIG. 10A shows a more detailed example of a "flip widget" in a second state.

7   FIG. 11 shows method steps that can be carried out to define, create, and destroy an

8   environment according to a second embodiment of the invention.

9   FIG. 12 shows one possible system architecture in which various principles of the

10   invention can be implemented.

11   FIGS. 13A through 13C show one possible user interface for creating a group and

12   identifying group members.

13   FIG. 14A shows one possible user interface for selecting group members from one or

14   more lists.

15   FIG. 14B shows one possible user interface for selecting group members by composing

16   invitations.

17   FIG. 14C shows one possible user interface for selecting group members by composing

18   an advertisement.

19   FIG. 15 shows a banner advertisement 1501 displayed on a web site, wherein the banner

20   advertisement solicits participation in a group.

21   FIG. 16 shows one possible user interface for selecting communication tools to be made

22   available to group members.

23   FIG. 17 shows one possible user interface for selecting research tools to be made

24   available to group members.

25   FIG. 18 shows one possible user interface for selecting transaction engines to be made

26   available to group members.

27   FIG. 19 shows one possible user interface for selecting participation engines to be made

28   available to group members.

29   FIG. 20A shows an authentication screen for group members to gain access to a newly

30   created environment.

FIG. 20B shows a web page generated for a specific user-defined environment, including tools available to group members having access to the environment.

FIG. 21 shows one possible method of generating environments in accordance with various aspects of the present invention.

FIG. 22 shows one possible data storage arrangement for storing and manipulating brain writing cards.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A. COMPLEX INSTRUMENT TRADING ENGINE EMBODIMENT

A first embodiment of the present invention provides a second-generation version of a complex instrument trading system. The second-generation system includes specialized tools that were not included in the first version of the prior art CATEX insurance trading system described above. These tools represent a substantial improvement over the first generation and incorporate new concepts of communications in a trading environment, and other capabilities that did not exist in the first generation technology. In addition, it is believed that many of these tools are also applicable to software systems other than the Complex Instrument Trading Engine or Negotiating System (CITE) described herein. Thus, the inventive principles are not limited to trading systems for complex instruments, nor even to trading systems in general.

Primarily, the tools described herein ameliorate certain difficulties associated with trading of complex instruments. Complex instruments are instruments where there is more than one dimension for negotiation. As compared to such instruments as securities, complex instrument transactions take longer to research and consummate and require more extensive documentation. For example, stock trading employs a simple instrument (a share) and negotiation focuses on one dimension (price) while insurance contracts have many dimensions (term, price, coverage, definitions of perils, etc.). The stock market is relatively simple to automate -- as soon as bid and asked prices match, the deal is concluded in an instant according to the rules of the exchange. Automation of complex trading is much more difficult, since the parties must negotiate and reach agreement on multiple dimensions and document that agreement using an instrument specific to the precise agreement. Automation of complex instrument trading is more difficult in every way than trading simple instruments.

1   The trading model behind the Complex Instrument Trading Engine or Negotiating System
2   is built around a simple, four-step model of deal making. Referring to FIG. 1A, the steps are as
3   follows:

4   1. <u>Meeting</u>: Potential buyers connect with potential sellers with reciprocal interests. This
5   connection does not mean that a deal will necessarily be concluded but simply that the two
6   parties have some basis for continuing discussion. In simple instrument trading, it is typically
7   only necessary to advertise quantity and price offered or sought. Offers for complex instruments
8   must include substantially more detail and (frequently) extensive attachments or exhibits.

9   2. <u>Research/Analysis</u>: Each company considers its own position and/or offer and the
10   counter party's position. Using information and analytic tools from various sources, including
11   internal resources and resources provided by or through the trading system, each party does
12   research and refines its position. The multiple dimensions of complex instruments increases the
13   analytical complexity and limits the value of a simple market price. As indicated by the arrows
14   in FIG. 1, this step is usually performed iteratively with the negotiation.

15   3. <u>Negotiation</u>: Parties to the negotiation speak directly and exchange whatever
16   information is necessary to advance the deal. As indicated by the arrows in FIG. 1A, this step is
17   usually performed iteratively with the research step.

18   4. <u>Close</u>: the companies negotiate and sign an instrument that documents the deal. This
19   can be a complete and detailed contract, or it may be a simple memorandum. In simple
20   instrument trading, the actual trade agreement is often standardized by the exchange. In complex
21   instrument trading, the agreement must be more specific to the deal, though it is possible to use
22   such tools and fill-in-the blank forms.

23   Within a system using these complex instrument tools, trading parties can place offers to
24   buy, sell, or trade in a public area, and examine such offers ("listings") posted by others. Using
25   advanced communications tools the parties can conduct initial discussions to determine if a
26   placement is possible. Using tools described herein, the initial contact can be done anonymously.
27   If a deal seems possible, the system preferably provides access to the extensive
28   information necessary to assess the possible deal. This can include static information (e.g.
29   reports or data) maintained within the system, links to information providers outside the system,
30   online analytical tools, and links to providers of analytical services.

For complex instruments, the process of negotiating a deal is contemplated to be an iterative one, with successive stages of analysis and discussion. The need for extensive communication is one of the critical distinctions between trading of simple instruments (e.g. retail sale) and complex instruments. Complex instrument trading requires dialog and more -- exchange of documents (often voluminous), consultation with counsel and intermediaries, conferencing, and working together on the final agreement. For electronic commerce to have an impact in complex instrument trading, it must support and facilitate this communication, and not force traders to fall back on methods and technology outside the electronic trading environment.

The final step is closing the deal. The companies can negotiate a contract online. Tools provide sample, fill-in the blank contracts and memoranda of understanding as a starting point. Negotiators can begin with these, or they can use one of their own. Collaborative software makes it possible to display text simultaneously on each negotiator's screen and to work on the language together. When the contract is final, the system allows for secure, online signature, though companies not comfortable with electronic signature for very large deals may print a hard copy and sign it conventionally.

By creating electronic exchanges for complex instrument trading, the CITE tools can have a fundamental and positive impact on many areas of commerce:

1. An electronic exchange makes it possible to put an offer in front of more people more quickly than could be informed through direct contact, even allowing for active intermediaries or brokers.

2. Traders can advertise and conclude deals without the need for an intermediary when they have adequate support or internal resources.

3. Through better communications, wider exposure for offers, and the first steps towards standard contract language, electronic trading of complex instruments can substantially reduces transaction costs.

4. With lower transaction costs, it is possible to conclude deals that were not possible with higher overhead.

5. Through the immediate posting of the results of trades, pricing is moved towards a market basis, reducing research and analysis costs enormously. This speeds placement.

1   6. Smaller exposure means lower risk, and market pricing is an adequate surrogate for

2   analytically derived pricing in some circumstances. Together these factors make it possible for

3   traders to participate in markets or market segments in which they would not normally do

4   business.

5   7. By making it possible for all companies, large and small, to talk directly to each other,

6   electronic trading of complex instruments can lead to the democratization of the marketplace

7   increasing competition.

8   Overall, electronic trading of complex instruments has the potential to improve the

9   efficiency of markets enormously, and to establish markets in areas of commerce that are

10   currently done through intermediaries or on a one-on-one basis. The trading tools described

11   herein are designed to facilitate electronic trading of complex instruments. The first-generation

12   complex instrument trading tools broke new ground in the extension of electronic commerce into

13   new and more complicated markets. The table below summarizes the areas of new and improved

14   technology, organized into the four steps of the general complex instrument trading model.

Phase	First Generation Complex Instrument Trading Technology (PRIOR ART)	Advanced Complex Instrument Trading Technology
Meet	• Operates on private network only • Post a listing to board by filling out a form • Display listing summary in a table • Search listings by key word • Post response to listing on board	• Operates on private network or over the Internet • Post listing to a board by filling out a form • Listings and responses can have attachments and documents • Display listing summary in a table, with sorting by title, date, market type, buy/sell, or listing number. • Search listings by keyword • Register keywords with an electronic "agent" that monitors listings and sends notice of relevant new listings by Email • Post response to listing on board • Send private response (anonymously or with name

	• Establish communications with lister by following up on contact information in listings using unconnected communications tools	attached). • Response can be through a "reply card" designed by the trader posting a listing, to structure responses • Direct connection between listings and communications tool
Analysis	• Internet access to research resources, on line and third-party analysis	• Internet access to research resources, on line and third-party analysis • Research resources searchable using the same search engine and display as used for listings. • Online dialogs / user groups
Negotiation	• Requires private network • Directory of contact information for all traders • Connection between directory and Email client. • Directory not linked to other components of the system • Anonymous mail application providing for communications between two individuals • Anonymous mail delivered to mail client • No attachments for anonymous mail • No system for central repository of documents	• Works on Internet or private network • Directory of contact information for all traders. • Direct connection between directory and Email client • Direct connection between directory and online conferencing software • Directory linked to listings and document management tool • Anonymous mail application providing for communications between individuals or groups of people working together • Anonymous mail does not require separate Email client software • Anonymous mail supports attachments • Internet-based system for distributions and sharing of documents. • Password and secure has protection for documents.
Closure	• Requires private network • Online signature of uploaded	• Internet or private network • Online signature of uploaded

	document	document • Registration / closure of deal through a fill-in form • Provision for digital signature and archiving of all documents associated with a deal

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2   Referring to FIG. 1B, one aspect of the system within the framework of the

3   negotiation/analysis loop shown in FIG. 1, is the ability to define one or more contracts, for

4   example, in the parlance of the reinsurance trade, "slip sheets." Various members of a group of

5   authorities modify the contract causing it gradually to take a final form that is either rejected as

6   untenable or accepted as a finalized deal. The system exposes various aspects of the contract and

7   attendant documents to the appropriate participants in the transaction, also providing each with a

8   level of authority to add, delete, or modify documents as well as the evolving contract or

9   contracts (assuming there may be various contract templates being discussed). These filters

10   (filter 1 through filter 4, for example), as shown in FIG. 1B, determine the authority of the party

11   (Party 1-Party 4) to modify or see the data object, whether it is a document or a slip sheet. The

12   system combines this system of filters with signature technology for closing the deal; that is,

13   implementing signatures so that an enforceable contract is generated.

14   A deal is like any other data object and once it is defined and entered, it cannot be

15   modified. Elements of the deal can be "signed" such as documents attached to a contract (for

16   example, Contract 1 has documents D1 and D2 attached to (combined with) it. Together these

17   elements, the contract and the attachments, define the deal. Also, the entire deal 245 can be

18   signed using a signature device ("widget") S8. Other documents may relate to a deal but not be

19   attached. These can be viewed using a document manager described further below.

20   <u>Listing System</u>

21   Referring to FIG. 2, a listing screen displays all offers for contracts, for example offer

22   314, as well as responses to them, for example, response 313. The parameters of the offers and

23   responses to them are shown in columns, the heading of each of which may be selected to sort

24   the listings by that heading, for example heading 315 if clicked would sort by the unique index

25   number for the listing. Notice that the responses (for example, response 313) are shown indented

26   to indicate a series of elements of a dialogue-thread. As indicated, the responses have a

1 "daughter" relationship to the parent listings. That is, listing 314 is a parent and reply 313 is a

2 daughter. The daughters remain in their hierarchical position beneath the parent despite sorting

3 by the column headings. This makes the tabular sort scheme compatible with a threaded display,

4 which is useful to show dialogues.

5   Referring now also to FIG. 3, when a user invokes a display of the details of a listing by

6 clicking on an index hyperlink 312 to show the details of the listing, a user interface element

7 displays the lister's defined parameters of the listing. As shown, various parameters are

8 displayed, many of which are hyperlinked. For example, attachments 304 may be selected to

9 display the corresponding attachments. A detailed description 301 may be provided as well as

10 specific instructions for responding 302. A reply button 303 permits the user to reply.

11 Activating the reply button 303 will either invoke a standard public reply screen which creates a

12 new listing similar to the parent listing or a special reply defined by a reply card which is further

13 described below.

14   A reply to a listing can take the form of a public reply that invokes a screen substantially

15 the same as FIG. 3 but with blank spots for entry of reply information. A more useful kind of

16 response element is a reply card that can be defined by the lister. This is because in negotiations

17 on complex transactions such as reinsurance contracts and, for example, pollution emission

18 allowances, the parties with whom a lister would be willing to trade are limited in terms of

19 certain criteria. These criteria will vary from one type of transaction to another.

20   In an active trading system, the number of listings can quickly grow to a large number

21 and quickly exceed the number which can conveniently be displayed in a single table. Several

22 capabilities are built into the system to address this problem. First, by default, listings are

23 presented in order from newest to oldest. Second, the sort capabilities previously described

24 allow users to modify the standard order. Third, the total market may be divided into

25 subcategories. In the area of insurance catastrophe risk, these could include categories for

26 different lines of insurance (e.g. marine, aviation, commercial buildings). Fourth, users may

27 enter search criteria to identify a subset of listings of particular interest.

28   Searching listings: A user may enter a keyword such as "hurricane" to identify all listings

29 that contain that word in the title, description, and (optionally) attachments. To improve the

30 reliability of the search, users are provided access to a standard lexicon when composing a

1   listing. In the first embodiment, this capability is invoked by pressing the right mouse button
2   while the cursor is any field of the listing. A list of common terms is displayed. The user can
3   select the term of interest, which is then placed into the text of the listing at the insertion point
4   marked by the cursor. For example, a listing for insurance risk would typically include a field
5   for geographic scope (i.e. the location of the properties to be insured). When in this field, the
6   lexicon displayed would include terms such as "California" and "Coastal Florida". Choosing a
7   term from the lexicon insures uniformity of terminology across listings and between the search
8   engine and the listings. "California" will be used rather than a mix of "Ca", "CA", "Calif", etc.
9   The search is further improved by symantic indexing. Essentially, this means that synonymous
10   terms are grouped, so that searches for one will find the other. . A person who searches for
11   "California" will get listings for "Los Angeles" that do not include the word "California".

12   The search engine can include an agent capability. This agent capability offers the user
13   the option of saving a search, after the user reviews the results and deems them acceptable. This
14   search is retained in a library of searches along with the email address of the owner of the agent.
15   The search is retained in the library until is it either deleted by the user when it is no longer
16   needed or automatically deleted in a cleanup of searches older than a certain date. Whenever a
17   new listing is placed on the system, all of the saved searches are executed. If the new listing
18   meets any of the search criteria, a message is sent to the owner of that criterion via email or
19   instant messaging.

20   A model was developed to allow a lister to define a set of criteria and request a set of
21   information from any respondents in the form of an anonymous reply "card." The card defines a
22   set of requested information which may be packaged as a document object and placed in the
23   document manager system and connected with each listing. A user would download the reply
24   card and fill the card out and send it back to the posting party.

25   A document object, called a reply card, is made available to a respondent through the
26   document manager. The respondent is permitted to retain his anonymity as is the lister. Each
27   may communicate with the other through an Amail system described in more detail below. The
28   respondent supplies the requested information and sends the data to the lister. A system in the
29   listing manager allows a lister to define a reply card having any particular fields and instructions

1 required of a respondent. Some of the information required may be obtained automatically from

2 a set of default data stored on the respondent's computer.

3 Referring to FIG. 4, a reply card definition screen is invoked to define the parameters of a

4 new listing. The new listing is defined using a user-interface element looking much like FIG. 3.

5 While the details are not critical, the definition of reply card involves, in essence, the definition

6 of a user-interface control such as a dialog with radio buttons, text boxes, etc. These are

7 definable for server-side implementation through HTML and are well known so the details are

8 not discussed here. The lister defines a set of controls that allow the entry by a replying party of

9 the information that the lister requires. The reply card is stored as any other information object

10 and may be organized and accessed through the document manager described below. FIG. 4

11 shows a simple example of a format of a reply card.

12 A reply card is created by a user when posting a new listing. The lister specifies the

13 information that must be included in a response, and the type of information object to display for

14 the data element (e.g. a text box, check box, radio button). The system then creates an HTML

15 page to collect the requested information. When a respondent clicks "Reply Card" on the listing

16 screen, the page is displayed. All of the responses are automatically entered into a database

17 created automatically when the reply card is composed. As each respondent fills out a reply card,

18 a new record is added to the database of the system and the lister is permitted to view it through

19 an appropriate filter as discussed above.

20 Signature System

21 As business is increasingly done in an electronic environment, electronic signature and

22 approval is becoming more critical. The typical electronic signature model has focused on two

23 aspects:

24 1. Electronic validation of the user -- specifically determining that the person viewing a

25 document on line is the authorized signatory; and

26 2. Validating the document being signed by a means that either prevents modification of a

27 document or will reveal whether changes have been made.

28 Methods for validation of identity range from simple personal identification numbers or

29 passwords, to electronic signature pads, and more advanced methods of biogenic validation such

30 as fingerprint or retinal patterns. Methods for document validation range from simple archiving

1   of one or more copies in a read-only model or inaccessible location to methods based on

2   mathematical algorithms that create a characteristic number or alphanumeric string for a

3   document. These strings are termed "electronic signatures." Changes to the document change

4   the electronic signatures. Because the signatures are much shorter than the documents, very

5   many documents have precisely the same signature, but the algorithms to calculate the signature

6   are very difficult to invert, so that it is effectively impossible to deduce a meaningful change to a

7   document that will preserve a specific signature.

8   These two aspects of electronic signature are highly developed, but there has been little

9   analysis or development of the general process by which documents can be signed.

10   The invention allows for secure and reliable routing of documents, for which signatures

11   are required, to a specified list of signatories. Unlike prior art systems, such as ordering or

12   accounts payable systems which have highly structured signature procedures tailored to a specific

13   process, the present invention provides a flexible method and system that allows a signature-type

14   of authority/requirement to be attached any kind of information object. The method is sufficiently

15   abstract, flexible, and general that it can be applied in many contexts aside from the CITE

16   embodiment described in the present specification.

17   One signature method/device employs the following steps:

18   1. Registration of signatories – This process provides a register of identifiers indicating entities

19   with signatory authority and correlates these identifiers with the information objects for which

20   the signatory authority is applicable. The same register may also be used to identify other types

21   of authority in the system in which the signature device is implemented. For example, document

22   read authority, modification authority, exclusive access to documents, etc. may also be provided

23   in the same register. Signature registration may be provided automatically in certain systems

24   where registration of, for example, read/write authority is provided since any entity with

25   signatory authority would in almost all instances, also be provided with some other kind of

26   authority, most notably, read authority. Thus, where the signatory system is embedded in certain

27   kinds of systems, it may be that no particular additional method or device is required to

28   implement signatory registration since an existing register may already exist or be required for

29   other purposes.

1   Registration information includes the general categories of information listed below.

2   Definitions of specific fields within these categories are a function of the specific implementation

3   of the signature system or the parent system. The following are exemplary:

4   1. Identity – unique identifier of the entity, the organization(s) with which the entity is

5   affiliated, other relevant information.

6   2. Contact information – information indicating how the entity can be reached, how

7   documents and mail messages can be routed to the entity.

8   3. Security Information – a password for each class of signature as described further

9   below.

10   2. Classes of signatures – The device/method provides a variety of classes of signature, each

11   associated with a unique level of approval or level of commitment. For example, a class of

12   signature-authority can be defined that represents individuals, for example, with authority to sign

13   contracts only below a set amount, or for expenses relating only to one department of an

14   organization, or within certain time constraints, etc. The signatory system maintains this

15   taxonomy of possible signature types in a database with a unique identifier for each level of

16   authority defined.   The system allows the creation and deletion of classes. Each class is

17   preferably permitted to be named and a descriptive definition attached to each class.

18   3. Defining a Set of Signatures – Using an appropriate user interface element, the user of the

19   system selects an information object (for example, a document, file, or collection of such objects)

20   requiring signature(s). The entity originating the signature process then identifies the entity or

21   entities required to sign the object. The specification of the signers can proceed either by the

22   selection of individuals from a list supported by the above defined entity register. Alternatively,

23   in an environment where individuals are strongly bound to organizations, for example, it can

24   proceed by selecting the list of organizations that will sign and, within each organization, the

25   person who will sign. The list is built by a series of selections. After each selection from the list,

26   the user indicates his/her desire to add the selected individual to a list of required signatories.

27   The user interfaces provides for entries in which all the selected signatories are required or only

28   one of the selected signatories are required.

29   For example, if more than one entity is selected from the list prior to the selection (e.g.,

30   clicking an "Add" button), the system may require a signature from any of the people selected,

1 but not all of them. To require signature from every member of the group, the initiator may
2 select one person, then "add", select the second, then "add", and so on. Thus, adding a group
3 with one "add" command would provide an "any signature will suffice" list and adding members
4 individually would require a signature from that individual or entity. Note that this technique
5 may also be used to define combinations of required and "any of" groups.

6   For each signer or group of signers selected in a single "add" command, the initiator of
7 the signing sequence must specify the class of signature associated with the person for the
8 document being signed. This may be selected from a list of signature classes (see item 2). If the
9 specific implementation of the signature process only supports one class of signature, the
10 selection of class may be omitted.

11 4. Random or Serial Order of Signature – After or concurrent with the creation of a signature
12 list, the initiator specifies whether signatures must be in order or if a specific order is not
13 required. For purposes of defining the order of signature, individuals who are selected as a group
14 are considered as occupying a single place in the sequence.

15 5. Document Authentication – Upon initiating a signature sequence, the information object is
16 authenticated by means of a secure hash algorithm. The specific hashing algorithm is a matter of
17 design choice or may made dependent on a user's choice. There are several possible hash
18 algorithms available in the public domain. The electronic signature produced by the secure hash
19 algorithm is archived with the information object in a secure repository. If the information object
20 is, for example, a record in a database, the contents of the record are copied to a file in delimited
21 format for archival purposes. If the object is a table, the table is exported prior to archive.

22 6. Document Routing – Upon initiation of a signature sequence, the initiator specifies how the
23 signatories are to be informed. The options are:

24   • No notification from the signature system

25   • Email message

26   • Email message with attachment of the information object.

27   • Posting on a signature web site

28 The system accepts and implements the chosen method, which may be connected to the signature
29 or a single choice applied to all signatories. Alternatively, the method of notification may be
30 stored with the signature class definitions. In a signature process with no required order, e-mail

17

1 notice may be sent simultaneously to all of the designated individuals at the time of initiation. If

2 the process is serial, only the first person may be notified. The electronic signature of the

3 information object may be included in an e-mail message.

4 7. Accessing the signature system – The signature system can be implemented for access via a

5 web browser or database client-server software across the Internet, an intranet, a LAN, or a

6 WAN. Access to the system will typically require a password, but this may not be necessary on a

7 secure network. Upon access to the system a user will have the option to display a list of all of

8 the information objects which he or she has signed or is being asked to sign. For each object, the

9 display can include the following information:

10 • Object name

11 • Description of object (text, mime, size, date)

12 • List of scheduled signatories

13 • Date each person signed

14 • Class of signature for each person

15 • Electronic signature produced by the secure hash algorithm

16 If the object is available (viewable) on line, the display may also include a link to display or

17 download the object.

18 8. Validation of the Object at Time of Signature – If the user downloads or views the object, the

19 system will execute the secure hash algorithm to calculate the electronic signature. This will be

20 displayed so that the potential signer can compare it to the signature calculated at the time the

21 process was initiated. If the user has previously downloaded the object or received it as an

22 attachment to an Email, the user may access the secure hash code through the signature system

23 and apply it to the version on the user's disk.

24 9. Signing a Document – After the user has determined that an information object is authentic

25 and that the contents merit signature, he or she can affix a signature by authenticating his or her

26 identity. Various means of authentication may be used. The means of authentication may be at

27 the discretion of the manager of the signature system. Such means may include personal

28 identification numbers, passwords, authentication based on computer address or information

29 stored on the signer's computer, third party validation using a public key or other security

30 infrastructure, or biogenic (fingerprint-recognition, retina scan) methods.

1   After a document is signed, the date of signature is recorded in a database so that the

2   display to other potential signers is updated. If the signature process is serial, the next person in

3   the sequence is notified. E-mail notice can be sent to all signers when the last signature is

4   collected.

5   10. Follow-up – At the time a signature process is initiated, the initiator can select a time (in

6   hours, days, or a time or date-certain) for automated follow-up. If a document is not signed

7   within the specified period after notice, a follow-up e-mail can be sent as a reminder. Additional

8   reminders may be sent at the same interval if the object has not been signed. The reminders can

9   be sent automatically by the system according to user-input specifications.

10   11. Cancellation – The initiator of a signature sequence can modify the sequence at any time,

11   except that a signer can not be deleted from the list once they have signed an object.

12   12. Transfer of authority – The individual initiating a sequence can transfer the right to modify

13   the list signature list to another individual in the system with appropriate validation of identity.

14   Document Manager

15   Successfully conducting commerce over an electronic network requires the exchange not

16   only of messages, but of substantial blocks of information in the form of documents and data.

17   Beyond simply transferring files from hand to hand, it is often necessary for multiple parties to

18   work on a document simultaneously or serially, to track changes, and to maintain a record of

19   versions. Two general architectures have emerged for document management, which can be

20   termed a "mail model" and a "repository model." Under the mail model, documents are attached

21   to messages and circulated person to person. Under the repository model, documents are placed

22   in a central location. There are advantages and disadvantages to each. At a summary level:

	Mail Model	Repository Model

Advantages	Precise routing on a document specific basis. Push in the recipient is informed of a new document. Coupling between document flow and a messaging. Dating is automatic.	Compact storage -- only one version of a file need to be stored. Natural group of files on the basis of subject or access group. Supports good configuration management and version control.
Disadvantages	Creates multiple versions of a document, confounding configuration management and version control. Does not easily couple to online collaboration. Many mail servers limit size of attachment. Relatively high effort to prepare messages.	Not push in the sense that users are automatically informed of new documents. Security model is more complicated than for email. Prior arrangement is necessary to access a repository.

1

2   A browser-based document management model and tool combines the best features of

3 repository model and the mail model, for document dissemination and sharing across the Internet

4 or an intranet.

5 General Architecture – The general architecture of the system combines two basic components:

6 (1) a database of directories and documents and (2) a directory of users. The directory of

7 documents lists documents (of any type) contained in the system, and folders that can contain

8 documents or other folders. The directory of users contains a list of individuals and

9 organizations that can access the system, with passwords and/or other information necessary to

10 validate identity and to establish authority.

11 Representation of document – The term "document" is used here in the broadest sense of any file

12 that can be stored magnetically or electronically. Preferably, each file is given a unique name

13 consisting of a string of no more than 256 characters. Preferably, the character set is limited to

14 those members of the ASCII character set which are displayable or printable. Thus, such codes

15 as "escape" which have no visible representation, would be excluded. This is the file name that

16 is displayed for purposes of identifying the document to the users. There is also an actual file

17 name (which is not shown to users) to identify where copies of the file are stored in the central

18 repository. Certain other information is kept in addition to the name of the file. This includes

19 the following:

20   1. Data of creation

1 2. Date entered into repository

2 3. Person who entered the document into the repository

3 4. Description

4 5. Size of the document

5 6. Document type if known

6 7. Date of last update

7 8. Access password (optional) stored in encrypted form

8 9. File folder(s) where the document appears

9 10. Actual file name

10 In addition to the above information, data indicating whether the file is checked-out and

11 to what entity, and the identities of entities that have checked the document out and returned it in

12 the past are also stored. The term "checking out" is described further below. These functions

13 related to file change control and configuration management, which are discussed later.

14 <u>User database</u> – A database contains information on all individuals who can currently access the

15 system or who previously had access up to an administratively determined retention period. This

16 database includes standard contact information including physical and electronic addresses.

17 Security data such as passwords and/or encryption keys is also maintained. In a combined system

18 such as the presently described system, the same database or registry of users can be employed

19 for the document manager as for the signature system.

20 <u>High level directories</u> – The entire document management system can be divided into a number

21 of high level directories that the user can display, one at a time. These include, at a minimum, a

22 "Private" directory of files and folders visible only to the user, and a "Public" directory of files

23 and folders visible to all users. Additional high-level directories can be created by the system

24 administrator as needed. These could correspond to projects, business units, or any other logical

25 basis. At any point in the use of the document management system, a user can see and select

26 from the high level directories to which the user has access. The name of the currently open

27 directory can be always displayed on the screen.

28 <u>Displaying the contents of a high-level directory</u> – When a user selects a high-level directory, the

29 repository displays a series of file folders against the left margin of the active window. File

30 folders whose contents are displayed are shown as open folders. File folders who contents are

1   not displayed are shown as closed folders. A folder is opened or closed by clicking a single time.

2   When a folder is opened, the contents are shown with an indent to indicate the parent/child

3   relationship between the folder and its contents. Each folder can contain files, shown by an icon

4   representing a printed page and other folders, represented by an image of a closed folder.

5   Information about a folder – Information about each folder is displayed on the same line, to the

6   right of the folder icon. This information is as follows, from left to right:

7   1. Name of the folder

8   2. Number of files in the folder, or the word "empty"

9   3. Accessibility of the folder

10   Accessibility refers to user access rights to a folder which may private relative to the entity that

11   created it, restricted (limited to a subset of people who can access the high level directory), or

12   shared (available to everyone with access to the high-level directory). The level of access to a

13   directory is indicated by the words "private", "restricted" or "shared."

14   If the directory is restricted, clicking on the word restricted displays a list of the entities

15   that have access to the folder. This list is a series of hyperlinks. Clicking on the name of a

16   person pulls up detailed contact information (discussed below). The objective is to facilitate

17   communications between people with a shared interest in a file.

18   Information about a file – Information about a file is displayed to the right of the file icon. From

19   left to right, the first item displayed is the name. This is followed by the word "details." Clicking

20   on "details," causes the document management system to display complete information about the

21   file (see Item 2, above), the person who placed the document in the file, (see Item 3, above), and

22   the person who most recently modified the file.

23   Information about people/entities, and the link to communications – Information about

24   people/entities with access to the system is displayable at several points in the document manager

25   system:

26   1. by accessing the directory of users

27   2. when creating a new folder with "restricted" access

28   .3. when displaying detailed information about a file (see #7)

29   4. when displaying information about a restricted directory (see #6)

1 Whenever such information is displayed, contact information from the database is rendered along

2 with the name. Depending on the implementation, this can include complete contact info

3 (multiple addresses, telephone and fax numbers, and email addresses), or some of the contact

4 information may be restricted, in which case it is not displayed.

5 Creating a new top level folder – A new folder is created within a high-level directory, for

6 example by clicking a button labeled "new folder." This can bring up a dialog in which the user

7 assigns a name to the new folder and selects the type of access (private, shared, or restricted)

8 rights to be assigned. If the document is restricted, the user specifies the entities (organizations

9 and/or people) that can access the folder. If the creator of the folder specifies that an

10 organization has access to a folder, all individuals associated with that organization may be

11 granted access. Folders to which a user does not have access may remain hidden or not

12 displayed. Alternatively, these folders can be shown with some indication that they are not

13 accessible, for example, by ghosting.

14 Functions related to a folder – Once a folder is defined, a user can execute the following options.

15   1. Create a subfolder, using the same process described in 9

16   2. Add a document to the folder, using the process described in 11

17   3. Delete the folder, if it is empty

18   4. Modify access to the folder using the same tools used to specify access initially

19 The functions can be invoked by, for example, clicking on the appropriate label to the right of the

20 name of the folder icon.

21 Adding a file – Users add a document using a dialog box that prompts for the following

22 information:

23   1. Location of file - may be entered by user, or selected through a standard file browse

24   dialog

25   2. Name to be used for the file in the repository

26   3. Version number or name (optional)

27   4. Password or encryption key (optional)

28   5. Description (optional)

29   6. Access rules (read only or read-write)

1   After entering the above information, the user either aborts or initiates upload. The
2   information listed above is recorded along with the name of the person entering the document,
3   and date and time.

4   File options – The following functions may be provided, preferably for every file in the system:

5   1. Delete (with confirmation)

6   2. Archive. The file is removed from main repository, but a copy is retained outside the
7   repository. It may be restored though manual intervention.

8   3. View or download: a copy of the file is brought to the user's computer. This file can
9   be modified there for the individual user's use. A modified version can be uploaded as a
10   new file or different version of a current one, but a file in the repository can only be
11   replaced if the user has it checked out.

12   4. Check out / check in (see below)

13   5. Forward (see below)

14   6. Change Password. The old password must be entered followed by a new password and
15   confirmation.

16   7. Move: copy or more a document from one folder to another.

17   The functions may be invoked, for example by clicking on a label corresponding to the
18 function, which can be displayed to the right of the name of the file. Not all options are shown to
19 all users. If an entity does not have write-access to a file, the entity may not delete it, archive it,
20 check it in or out, or change the password.

21 Check in / Check Out – All entities with write access to a file may check it out. By checking the
22 file out, the entity reserves the exclusive write to save changes to a file. A person may not
23 replace a file that is checked out. To check out a file, the user selects this option from the list of
24 functions associated with the file. The user can then enter an expected return date and a reason
25 that the file is checked out or the changes to be made. This information is available to all others
26 who can view the file. Each check in or check out is recorded in a permanent log. After a file is
27 checked out, the "check out" button or link is changed to read "check in."

28   Each individual can check in only the files that he or she has checked out. This is done
29 by clicking "check in." The user may then upload a new version of the file by specifying the
30 location of the file on disk, or indicate that the version of the file currently in the repository is to

1   be retained. After a file is checked in, the check button is changed back to "check out" and the

2   file can be checked out by another user.

3   Forwarding - A file can be forwarded to any other user of the system. When the forward function

4   is invoked, a list of users is displayed. The sender selects one or more users. Upon confirmation,

5   a copy of the document is placed in folder labeled "in box" in each recipients private directory.

6   Referring to FIG. 5, a main screen for the document manager creates (using server-side

7   scripting) a user-interface display with some of the features of a Windows Explorer® -type

8   display. File and folder icons are shown along with an array features arranged next to each. The

9   similarities with Windows Explorer® fairly well end there, however. Each of the properties

10   shown next to each file/folder entry invokes a feature.

11   A parameter object W "Details" invokes a detailed display of the corresponding

12   document object. The details can include contact information about the creator of poster of the

13   document or other data as desired. This data can be hyperlinked and a return button can be

14   provided to return the display back to the screen shown in FIG. 5. Clicking the "details" button

15   to the right of any document brings up the display which can include the name, contact

16   information, and other details about the person who loaded the document into the system, similar

17   information about a person who has the document checked out, and, optionally, a description of

18   the document and information on its change history.

19   A parameter object X "Forward" simply sends the document to a selected user. A

20   selection screen can be invoked to allow selection of the recipient of the document from the user

21   registry. Of course, since most correspondence can be handled on the server side, the user is, in

22   reality, simply notified of the transfer and the recipient's action to view the document simply

23   invokes a server side feature to display the document. The document is not actually transferred

24   bodily to the recipient since the recipient, as a registrant logged in the user registry, can access it

25   through the server by requesting to do so.

26   A parameter object U "Check-in" checks in a document that has been checked out. Other

27   users may view the document, but not modify it when it is checked out. This button is not

28   accessible to users that have not checked the document out and may be displayed ghosted or not

29   displayed at all. A similar button can be displayed if a document that is not checked out may be

30   checked out by the user authorized to see the document manager displayed shown in FIG. 5.

1   A parameter object T "Download" actually transfers a copy of the document to the client

2   computer. Another object S "Delete" allows the document to be deleted. A new document can

3   be added by clicking "New Document" Q. These are fairly conventional notions, except for their

4   placement on the screen and the fact that each is filtered depending on the user's rights.

5   Note that when a folder is created, access to the folder can be restricted to the creator,

6   shared with everyone (in which case the folder is created in the public directory), or shared with a

7   select group of other users. The other users can be selected by company or organization

8   (providing access to all individuals in the organization) or by individual within an organization.

9   These are all selectable through a linked selection control where if one selects a company in one

10   selection control, it shows employees in the linked selection control.

11   A parameter object P "Shared" displays a hyperlinked page that shows all users with

12   access rights to the document. This page allows a user that places a document in the document

13   manager or a user that has pertinent modify rights, to alter the parties that have access to the

14   document. Also, it allows a user with read-only rights to see the list of users that can access that

15   document. The names of the sharing parties are hyperlinked to invoke the user's email client to

16   allow fast sending of email (which again may be performed server-side without actual transfer)

17   or conventionally or selectively. If a folder is shared, the word "Shared" appears to the right of

18   the folder. Clicking on "Shared" brings up the list of person who can access the folder, as shown

19   in FIG. 6. Each name is a hyperlink to detailed contact information.

20   FIG. 7 shows a list of all deals that were completed through the system. The trade

21   number (left column of the grid) is a hyper link to detailed information.

22   FIG. 8A shows detailed information about a completed trade. It shows the party to the

23   trade, the price or rate, and a description of what was traded. The particular nomenclature is

24   specific to a market. For insurance, for example, price is termed rate, and the summary of a deal

25   is the slip sheet. A complete contract can be attached. Included documents can be downloaded

26   to view on line. The intended signatories to a deal are shown (there can be more than two).

27   If a signatory has actually signed the document electronically, the date and time are

28   shown. No date and time are shown for parties that have not yet signed. The amount of

29   information displayed on the screen is dependent on the identity of the person viewing the screen.

1   The viewer can be blocked from viewing any information about a deal, or certain fields, such as

2   the contract details or the name of signatories.

3   Note that the detail screen of FIG. 8A would also show attached exhibits. The FIG. 8A

4   display is the basic device for signing deals. A similar device would be used for signing

5   documents.

6   Referring to FIG. 8B, all of the information necessary to document a deal is pulled

7   together through the screen below. The deal summary includes highly structured information on

8   parties, dates, terms, etc., as well as unstructured information in the form of attachments. The

9   bottom part of the page allows the person registering the deal to designate the intended

10 signatories.   When the signers affix their electronic signature, they are doing so to all of the

11 documents in the deal, including the attachments. These are archived and protected from

12 tampering using secure hash technology.   In this way it is possible to create a reliable, on line

13 electronic signature to a complex deal, without risk of repudiation.

14 Note that any number of exhibits can be added to the UI device of FIG. 8B since the list

15 scrolls from the bottom each time a second exhibit is added. The user interface has self-

16 explanatory elements for defining information about the deal.

17 Anonymous Mail

18 For purposes of the following description, a "subscriber" is a person or entity that

19 subscribes to an anonymous mail system to be described below. Certain types of negotiations

20 and communications require anonymous initial contact, followed by some period of anonymous

21 discourse, leading to eventual disclosure of the parties' identities. In the course of a typical sale

22 or business deal, the initiating party begins either by contacting one or more targeted potential

23 trading partners or advertising to a community of potential partners. While the identity of the

24 initial offeror is usually clear in any direct contact, it need not be so in advertising. In certain

25 cases it could be problematic for the initiating party to reveal his or her identity:

26 A party to a deal can have difficulty controlling the method of contact once the party's

27 identity is known. If a company is known to be in the market for office space, for example, the

28 party may be subjected to badgering by real estate firms outside the established bidding process.

29 Executives of the company may be contacted directly in an effort to influence the decision.

Disclosure of intent may adversely affect the market. If a large company begins to acquire land in an area, the price can rise very quickly. Simple exploration of an option can make the option more costly or even impossible.

Disclosure of intent may adversely impact the reputation or standing of a company. An insurance company that determines that it is over exposed to a certain peril (e.g. hurricane losses in the Southeastern U.S.) would reveal that situation to their competitors and investors by a large public solicitation.

While anonymity can be crucial for the initiator of a deal, it can be equally important for the respondent for the same reasons. The need for controlled anonymity has been addressed by several methods that were initially developed for paper communications and have been extended to analogues in telephonic and computer communications.

- Numbered mail boxes, including government and private
- Communications through a mediator
- Anonymous voice mail drops
- The use of pseudonyms in computer e-mail and dialogs.

These methods have several serious shortcomings:

- The method may only allow anonymity from one side.
- There is no inherent mechanism to validate the credentials and intent on an anonymous party
- Use of a pseudonym may invalidate its future use by associating the name with a specific party
- Manually mediated communications are slow
- The creation and deletion of pseudonyms may not be completely within the control of the party, imposing an overhead cost (in cash or labor) and/or delay in creating a new name
- In most systems, a person with multiple pseudonymous mailboxes or e-mail addresses will receive communications in several different places (mailboxes or accounts), thus requiring multiple logons/passwords.

1 • Routing of messages received anonymously requires manual forwarding to all

2 relevant parties by the individual with access to the anonymous mail box or email

3 account.

4 • There is no mechanism to reveal actual identities in a secure and mutually

5 acceptable way.

6 The present invention addresses these deficiencies by providing two-way anonymous

7 communications, a central point of collection for messages sent to multiple pseudonymous

8 addresses, connection of multiple parties to a single anonymous account, and a mechanism to

9 reveal identities to all parties to a deal simultaneously, by mutual consent. In summary, the

10 anonymous mail system is a server side system that allows clients to create anonymous handles

11 on the fly. It also allows them to share anonymous handles among multiple recipients so that the

12 group of recipients appears as a single recipient to the sender using the anonymous handle. It is

13 like a transparent mailing group. When mail is sent to an anonymous handle, it is sent to all

14 members of the group.

15 Multiple Systems – In contrast to the first-generation anonymous mail system, the present system

16 allows for multiple anonymous mail (Amail) systems. Each Amail system operates in

17 association with a conventional e-mail server, and uses the e-mail server for communications

18 with non-subscribers, subscribers to Amail systems other than the local one, and for forwarding

19 messages to the subscribers Email client software.

20 Registration – Subscribers to an anonymous mail system (Amail) each complete a registration

21 that provides:

22 • Contact information (name, address, telephone number, fax, etc.)

23 • Information to determine whether they the party is qualified to participate in the

24 communications exchange. For example, if the system were to be used between and

25 among real-estate agents, registrants to the system might be required to supply a real

26 estate license number.

27 • Association with an organization (if appropriate)

28 • Additional information on the individual or organization that may be of use to

29 others in the Amail system to determine the suitability of the party as a partner in

30 negotiations.

1 The additional information can include such factors as credit ratings, assets, or the region in
2 which the company does business. The specific information required depends on the application.
3 Insurance, real estate, energy marketing, etc. would all have different data of interest.

4 Validation – Depending on the business model and role of the organization operating the Amail
5 exchange, the organization can either accept the information provided by the subscriber, or verify
6 the information and provide verification as part of the service. Upon acceptance of a
7 subscription applications and validation of the background information if necessary, the use is
8 assigned an Amail user ID and password.

9   In the first version of the Amail system, logon was automatic from the general application
10 (CATEX); there was no separate user ID and password. In alternative versions, the Amail
11 system can provide its own user ID and password, with the ability to bypass logon when it
12 accessed from other applications with acceptable user validation. All of the actual contact
13 information and validation information are maintained in a database. Validation information was
14 not provided in the first version of CATEX.

15 Assignment of an Email address – Each subscriber must provide an Internet accessible Email
16 address or be assigned an e-mail address in the Amail system. The first version of the Amail
17 required that the user have an Email address on the system. The new version works directly with
18 e-mail systems other than the Amail.

19 Logon – Subscribers access the Amail system by connecting an Amail web page provided either
20 over the Internet or on an Intranet. The subscriber enters a user name and password. The first
21 version of Amail was not browser-based and worked only over a LAN or WAN, not over the
22 Internet or an intranet.

23 Available functions – After logon, the subscriber can access the following functions:
24   • Manage aliases
25   • Compose an anonymous message
26   • Read Amail messages. In the original CATEX system, the user could not access
27   messages from within the Amail application.
28   • Log off

29 Managing Aliases – Aliases are directly under user control. After logon, a user can:
30   • Add a new aliases

1   • Delete an existing alias

2   • Create a free-form note associated with a new alias, or edit the note for an existing alias

3   that will be accessible to recipients from the alias.

4   • Identify other subscribers to whom messages to alias should be forwarded

5   • Identify other subscribers with permission to generate messages from the alias

6   These last two features make it possible for a group of subscribers to share an alias, allowing

7   them share communications and work together more effectively. The user will:

8   <u>Compose an anonymous message</u> – After logon, a user can create and send an anonymous

9   message. After the option is selected, the system will display a message creation screen with the

10   following features:

11   1. A list of aliases currently owned by the user (i.e. created by the user and not deleted),

12   for the user to select the alias from which the message will originate.

13   2. A subject box for the mail.

14   3. A list of the e-mail and alias addresses to which messages can be sent for the user to

15   select one or more. The original version could only send to one alias. The user can also

16   supply an Internet e-mail address off system.

17   4. A list of the e-mail and alias addresses to which copies of the messages can be sent for

18   the user to select one or more. The user may also supply an Internet e-mail address off

19   system. The original version did not include a "CC" feature.

20   5. A space where the message can be typed, allowing for users to paste text copies form

21   another system using the Windows-based clipboard utility.

22   6. A check box to select whether the sender is willing to reveal his identify to the

23   recipient on mutual consent.

24   7. A check box to select whether the copies of the message should be sent to other

25   subscribers who share the Alias. The original version allowed only one subscriber to

26   access an alias.

27   <u>Delivery of Messages</u> – After an Amail message has been composed (see step 7), it is delivered

28   as follows.

29   1. The body of the email message is modified by adding a header including routing

30   information and an indication of whether the sender is willing to reveal identities if there is

1 reciprocal concurrence. The message would appear as shown below. The items in italics are

2 new since the original (prior art) version. The first generation of the anonymous mail system did

3 not allow for communications between multiple Amail systems and, hence, did not list the Amail

4 system name in the list of respondents. The first generation system also did not allow for

5 multiple recipients.

6

> *This message was sent anonymously from alias: Amail system name: alias*
> The message was sent to:
> Amail system name: *alias*
> Amail system name: alias (cc)
> Amail system name: alias
> The sender is willing to reveal identities.
> [Original body of the message]

2. If the message is sent to a specific, non-anonymous e-mail address, Amail composes and transmits a standard Email message. The sender is listed as "amail.admin.alias@xxxxx" where "xxxxx" is the address of the standard mail server supporting the mail system. Off-system access was not a feature of the first version.

3. If a message is sent to an alias on the local or any other related Amail system, and the owner of the alias has an off system email address, a message is sent as in step 1, above. In addition, however, the message is stored in an Amail message database for access through the Amail system interface. The original version did not have an Amail message database.

4. If a message has been sent to an alias for which there is no associated conventional mail account, the message is stored in the Amail message database. The Amail message database contains a repository for all messages, listing the subscriber(s) associated with the alias to which the message was addressed. The database contains the message (including sender, addressees, and ccs), date and time of transmission, and the alias of the subscriber to which the message was sent. The original version did not have an Amail message database.

5. If the option was checked to send copies to other that share the alias (see above), copies of the message are placed in the message database for the subscribers associated with each of the aliases.

Receipt of Messages – Messages sent from the Amail system can be received in a standard e-mail client by Amail subscribers and non-subscribers.

Amail subscribers can also receive messages through an Amail reader interface. All messages received are placed in the Amail message database (see above). Since an alias can be associated with more than one subscriber, the Amail message database can list more than one subscriber as an "owner" of the message even if it was sent to only one alias. When a user logs

1 on and selects the option to read Amail messages (see above) the messages are rendered as an

2 HTML page through a browser. Messages to all of the aliases associated with the user are

3 displayed. Each message has a hotlink to respond to send a message back to the sending alias.

4 Each message also has a link to display the background and validation information and note

5 associated with the alias (see above). The original version did not provide an Amail viewer nor

6 did it provide for display of validation information.

7 Responding from off System from Amail – Individuals from off system can respond to Amail

8 messages using the standard reply feature of their mail server. Messages will be returned to the

9 reply address (see above). Messages received by the conventional e-mail server supporting the

10 Amail system will forward the message to the Amail message repository for the alias listed in the

11 return address. Responding from a standard Email client was not provided in the original

12 version.

13 Flip Widget

14 Increasingly, computer applications are delivered through browsers over the Internet or an

15 intranet. There are many design considerations in building a system for browser delivery in

16 contrast to delivery as conventional client server application. Two related considerations are the

17 graphic richness of a browser screen and the time lag to render a new screen. Partly because

18 good web pages contain complex graphics and partly because the Internet can be a relatively slow

19 network, it is important to design a web application to make few unnecessary wholesale screen

20 changes. It is more economical from the perspective of data transmission and, hence, from

21 response time, to create a "flat" rather than "deep" hierarchy of screens, and change only the part

22 of a screen that is minimally necessary.

23 For example, it is better in a data query to provide a single screen that allows a user to

24 specify a state and city within the state than to provide a first screen for the state, followed by a

25 second screen for the city. As the function of screens becomes more complex, however, it

26 becomes an increasingly difficult challenge to fit all of the options onto the screen (particularly

27 when a user selects a lower screen resolution) and while maintaining a clean appearance. The

28 invention described here provides a tool that allows the Internet application developer to display

29 an effectively unlimited number of options in a very small space using a very familiar and

30 intuitive display feature.

Appearance – The "Flip Widget" tool renders a graphical object representing two rows of file folders, overlapping. The labels on the front row are visible, the labels on the second row are obscured by the front row of tabs, but the edges of the apparent back tabs are visible. The number of the apparent tabs displayed in each row is a function of the screen resolution and the length of the longest label entered by the user.

The Flip Tab – In one embodiment, the rightmost tab on the front row is labeled "FLIP". When a user actuates this tab, the response is as described below.

Database of labels and links – In creating the display, the application programmer enters a set of paired values. Each pair consists of (1) text of the label to be displayed and a tab, and (2) the name of an HTML link, either within or external to the page to be rendered when the tab is selected.

Action – Upon rendering a page containing the flip widget, the two-row tab display shows the first "n" options from the list of labels and links. The value of "n" represents the maximum number that can be displayed while allowing room for the flip tab. Upon clicking any of these tabs, the corresponding link is executed. Upon clicking the flip tab, the two-row tab display is changed to reflect the next "n" options from the list of labels and links, retaining the flip tab on the right. If there are fewer than n options remaining, the flip widget will either display the last n options, or whatever number remain supplement by as many options are needed from the start of the list. Clicking the flip tab when the list has been completed starts the cycle over again with the first option.

Referring to FIGS. 9 and 10, a flip widget in a first state is shown in FIG. 9. In the first state, any of the tabs A through E can be selected and the corresponding set of controls displayed. For example, in FIG. 9, tab B has been selected and the controls 430-432 are displayed. If the flip tab 410 is selected, a next row of tabs is brought forward so that the display appears as in FIG. 10 with tabs F through J showing. In FIG. 10, tab G has been selected and the corresponding controls 435-437 are displayed.

FIGs. 9A and 10A show a more detailed example of how a flip widget can be used to organize functions available to a user. For example, suppose that one application is a commodity futures trading system that permits a user to execute trades, review prices, and obtain other information relating to various metals such as gold, silver, and platinum. As shown in FIG. 9A,

1   for example, controls or functions 430, 431, and 432 (e.g., execute a trade, review current prices,

2   and the like) are associated with a "gold" category and can be invoked easily when that category

3   is at the forefront of the flip widget as shown. Clicking one of the other tabs (e.g., silver tab 400)

4   would bring the functions associated with that category to the forefront while allowing the user to

5   readily select other categories visible behind the front. Clicking "other markets" tab 410 would

6   change the selection of front-row tabs to a different set of categories, as shown in FIG. 10A. The

7   "other markets" tab 410 could be continually clicked to rotate through a plurality of groupings of

8   markets, each having a set of functions or controls associated therewith.

9   A flip widget can be implemented in conjunction with the first or second embodiments of

10   the present invention in order to permit many different functions to be displayed in a small screen

11   space. The flip widget is a device to organize many different functions in a logical way, and can

12   be used as a tool for building an interface to multiple applications. As one example, in a DCE

13   (described in more detail below), there may exist n functions (e.g. bulletin boards, chat rooms, e-

14   mail, a-mail, transaction engines, and the like) the specific availability of which can be defined

15   by a user who creates the collaborative environment. This collection can change over time.

16   Accordingly, the interface cannot be "hard coded" for a particular user.

17   One way to represent an indefinite (and potentially large) number of functions in a small

18   space is with tabs resembling a file folder, with a graphic element representing hidden cards,

19   implying that the user can reach the functionality on the cards by paging (i.e. flipping) to them.

20   The flip widget makes it possible to provide a link to a list of applications maintained in a

21   database rather than requiring that they be hard coded. Programming logic for storing folder

22   labels in a database, linking those labels with associated functions and activating them using

23   browser-type buttons, and for performing the display features described above, are conventional

24   and no further elaboration is necessary. Although the "flip widget" provides one method of

25   structuring a user interface to structure a user's view of application functions, other methods can

26   of course be used.

27   B. DYNAMIC COLLABORATIVE ENVIRONMENT EMBODIMENT

28   In a second embodiment of the invention, a dynamic, user-defined collaborative

29   environment can be created in accordance with a set of tools and method steps. As explained

30   previously, this system differs significantly from conventional networked environments in that:

1   (1) the environment (including access and features) is user-defined, rather than centrally defined

2   by a system administrator; (2) each environment can be easily destroyed after completion of its

3   intended purpose; (3) users can specify a group of participants entitled to use the environment

4   and can define services available to those participants, including offering participation to

5   unknown potential users; (4) the networked environment (including access features and facilities)

6   can cross corporate and other physical boundaries; and (5) the environment offers a broad

7   selection of tools that are oriented to communication, research, analysis, interaction, and deal-

8   making among potential group members. Moreover, in a preferred embodiment, the environment

9   is implemented using web browser technology, which allows functions to be provided with a

10 minimum of programming and facilities communication over the Internet.

11   FIG. 11 shows various method steps that can be carried out to define, create, and destroy

12 an environment according to a second embodiment of the invention. The term "environment" as

13 used herein refers to a group of individuals (or computers, corporations, or similar entities) and a

14 set of functions available for use by that group when they are operating within the environment.

15 It is of course possible for one individual to have access to more than one environment, and for

16 the same functions to be available to different groups of people in different environments.

17   The process of creating a collaborative environment involves the migration of tools and

18 information resources available in the library of the environment generator into a specific

19 collaborative environment. The collaborative environment can include / link to any application

20 available to the environment generator. It can also include applications specific to the

21 environment provided that theses are accessible through Internet protocols.

22   Underlying the environment is a directory of users, information about users, and their

23 authorities. The core structure for the environment user database should conform to a directory

24 standard – typically DAP (Directory Access Protocol) or LDAP (the lightweight directory access

25 protocol). The environment generator has access to its own directory of users and to the user

26 directories of the environments it has generated. The directory of an environment can be

27 populated initially by selecting users from the environment generator's directories. These are

28 added to the directory of the environment in one of two ways depending on the specific

29 implementation. Directory records can be copies from the environment generators user database

30 to a separate database for the environment or a flag can be added to the user data record in the

1 environment generators users database to indicate that the user has access to the environment.

2 The second, simple model is useful when all users in an environment have equal authority. A

3 separate user database (directory) is necessary for an environment when the environment has its

4 own security / authority model.

5 Additional members can be added through a set of standard application / subscription

6 routines. These then become known to the environment generator (as well as the specific

7 environment) providing the foundation for greater speed and efficiency in creating subsequent

8 environment.

9 Beginning in step 1101, a new group is created by identifying it (i.e., giving it a name,

10 such as "West High School Research Project," and describing it (e.g., providing a description of

11 its purpose). The process of creating a group and defining functions to be associated with the

12 group can be performed by a user having access to the system without the need for system

13 administrator or other similar special privileges (e.g., file protection privileges, adding/deleting

14 application program privileges, etc.). In this respect, environments are, according to preferred

15 embodiments, completely user-defined according to an easy-to-use set of browser-driven user

16 input screens. The principles described herein are thus quite different from conventional systems

17 in which a central system administrator in a local area network can define "groups" of e-mail

18 participants, and can install application programs such as spreadsheets, word processing

19 packages, and the like on each computer connected to the network. Moreover, according to

20 various preferred embodiments, the facilities provided to group members can be provided

21 through a web-based interface, thus avoiding the need to install software packages on a user's

22 computer.

23 It is also contemplated that various methods of obtaining payment for creating or joining

24 groups can be provided. For example, when a new environment or group is created, the person

25 or entity creating the group can be charged a fixed fee with payment made by credit card or other

26 means. Alternatively, a service fee can be imposed based on the number of members that join,

27 the specific functions made available to the group, or a combination of these. Moreover, fees

28 could be charged to members that join the group. The amount of the fee could also be based on

29 the length of time that the environment exists or is used.

1   Although not specifically shown in FIG. 11, step 1101 can include the step of creating a

2   new entry in a database table (e.g., a relational or object-oriented database) to store information

3   concerning the new group and the environment in which the group will operate. Database entries

4   related to the group, including some or all of the information described below, can be created as

5   the environment is defined. It is assumed that one or more computers are linked over a network

6   as described in more detail below in order to permit the environment to be created, used, and

7   destroyed, and that a database exists on one or more of these computers to store information

8   concerning the environment.

9   In step 1102, the group members are identified. According to various embodiments, the

10   group members can be identified in three different ways (or combinations thereof), as indicated

11   by sub-steps 1102a, 1102b, and 1102c in FIG. 11. It is contemplated that group members can

12   span physical networks and computer systems, such as the Internet. Consequently, group

13   members can include employees of different corporations, government agencies, and the like. In

14   contrast to conventional virtual private networks, both the group members and the functions

15   made available to those group members are entirely user-selected, thus permitting a broad range

16   of persons to easily create, use, and destroy virtual private networks and associated functionality.

17   First, in step 1102a, group members can be identified by selecting them from a list of

18   known users that are to be included in the group. For example, within a corporation or similar

19   entity, a list of internal e-mail addresses can be provided, or an electronic version of a phone list

20   or other employee list can be provided. If the hosting computer system is associated with a

21   school, then a list of students having accounts on the computer (or those in other schools that are

22   known or connected to the host) can be provided. From outside a corporate entity, users can be

23   selected based on their e-mail addresses (e.g., by specifying e-mail addresses that are accessible

24   over the Internet or a private or virtually private network). In this step, the environment creator

25   specifies or compels group members to belong to the group.

26   Second, in step 1102b, group members can be invited to join the group by composing an

27   invitation that accomplishes that purpose. For example, a group creator may choose to send an

28   invitation via e-mail to all members of the corporation, or all members of a particular department

29   within the corporation, all students in a school or region, or members of a previously defined

30   group (e.g., the accounting department, or all students in a particular teacher's class). The

1 invitation would typically identify the purpose of the group and provide a button, hyperlink, or

2 other facility that allows those receiving the invitation to accept or decline participation in the

3 group. As those invited to join the group accept participation, their responses can be stored in a

4 database to add to those members already in the group. Invitations could have an expiration date

5 or time after which they would no longer be accepted. As invitees join the group, the group

6 creator can be automatically notified via e-mail of their participation.

7   Third, in step 1102c, group members can be solicited by way of an advertisement that is

8 sent via e-mail, banner advertisement on a web site, or the like. Persons that see the

9 advertisement can click on it to join the group. It is also possible for advertisements to have a

10 time limit, such that after a predetermined time period no more responses will be accepted. The

11 primary difference between advertising participation in a group and inviting participation in a

12 group is that invitations are sent to known entities or groups, while advertisements are displayed

13 to potentially unknown persons or groups.

14   It will be appreciated that group members can be selected using combinations of steps

15 1102a, 1102b, and 1102c. For example, some group members can be directly selected from a

16 list, while others are solicited by way of invitation to specifically identified invitees, and yet

17 others are solicited by way of an advertisement made available to unknown entities.

18   In step 1103, the functions to be made available to the group are selected. For example,

19 the group can be provided with access to an auction transaction engine; a survey tool; research

20 tools; newswires or news reports; publication tools; blackboard facilities; videoconferencing

21 facilities; and bid-and-proposal packages. Further details of these facilities and tools are

22 provided herein. The group creator selects from among these functions, preferably by way of an

23 easy-to-use web browser interface, and these choices are stored in a database and associated with

24 the group members. Additionally, the group creator can specify links to other web-based or

25 network-based applications that are not included in the list by specifying a web site address,

26 executable file location, or the like. The group creator can also define shared data libraries that

27 will be accessible to group members.

28   In step 1104, the environment is created (which can include the step of generating a web

29 page corresponding to the group and providing user interface selection facilities such as buttons,

30 pull-down menus or the like) to permit group members to activate the functions selected for the

1   group. In some embodiments, access to the group may require authentication, such as a user

2   identifier and password that acts as a gateway to a web page on which the environment is

3   provided. Other techniques for ensuring that only group members access the group functions and

4   shared information can also be provided. A web page can be hosted on a central computer at an

5   address that is then broadcast to all members of the group, allowing them to easily find the

6   environment.

7   In step 1105, group members collaborate and communicate with one another using the

8   facilities and resources (e.g., shared data) available to group members. In the example provided

9   above, for example, a group of high school students collaborating on a school research project

10   could advertise for survey participants; conduct an on-line survey; compile the results;

11   communicate the results among the group members; brainstorm about the results using various

12   brainstorming tools; conduct a videoconference including group members at various physical

13   locations; compile a report summarizing the results and exchange drafts of the report; and

14   publish the report on a web site, where it could optionally be offered for sale through the use of

15   an on-line catalog transaction engine. The group could even contact a book publisher and

16   negotiate a contract to publish the report in book form using bid and proposal tools as described

17   herein.

18   In step 1106, after the environment is no longer needed, it can be destroyed by the person

19   or entity that created the group. Again, in contrast to conventional systems, the destruction of the

20   environment is preferably controlled entirely by the user that created the environment, not a

21   system administrator or other person that has special system privileges. Destruction of the

22   environment would typically entail deleting group entries from the database so that they are no

23   longer accessible.

24   FIG. 12 shows one possible system architecture for implementing the steps described

25   above. As shown in FIG. 12, an Internet Protocol-accessible web server 1201 is coupled through

26   a firewall 1202 to the Internet 1203. The web server includes an environment generator 1201a

27   which can comprise a computer program that generates user-defined environments as described

28   above. Further details of this computer program are provided herein with reference to FIG. 21.

29   Web server 1201 can include an associated system administrator terminal 1204, one or

30   more CD-ROM archives 1205 for retaining permanent copies of files; disk drives 1206 for

1   storing files; a database server 1207 for storing relational or object-oriented databases, including

2   databases that define a plurality of user-controlled environments; a mail server 1208; and one or

3   more application servers 1209 that can host application programs that implement the tools in

4   each environment. Web server 1201 can also be coupled to an intranet 1210 using IP-compatible

5   interfaces. Intranet 1210 can in turn be coupled to other application servers 1211 and one or

6   more user computers 1212 from which users can create, participate in, and destroy environments

7   as described herein, preferably using standard web browsers and IP interfaces. Web server 1201

8   can also be coupled to other user computers 1217 through the Internet 1203; to additional

9   application servers 1215 through another firewall 1216; and to another IP-accessible web server

10   1213 through a firewall 1214.

11   It will be appreciated that the system architecture shown in FIG. 12 is only one possible

12   approach for providing a physically networked system in which user-defined network

13   environments can be created and destroyed in accordance with the principles of the present

14   invention. It is contemplated that application programs that provide tools used in a particular

15   user-defined environment can be located on web server 1201, on user computers 1217, on

16   application servers 1215, on application servers 1209, on application servers 1211, or on any

17   other computer that provides communication facilities for communicating with web server 1201.

18   It will also be appreciated that web pages that provide access to each user-defined environment

19   need not physically reside on web server 1201, but could instead be hosted on any of various

20   computers shown in FIG. 12, or elsewhere.

21   Reference will now be made to exemplary steps and user interfaces that can be used to

22   carry out various principles of the invention, including steps of creating a group, selecting group

23   members, and defining functions to be made available to group members in the environment.

24   FIGS. 13A through 13C show one possible user interface for creating a group and

25   identifying group members. In FIG. 13A, a user gains access to an environment creation tool by

26   way of an authentication process. This may be a simple username and password device as shown

27   in FIG. 13A, or it could be some other mechanism intended to verify that the user has access to

28   the environment creation tool. In the case of a corporation, school, or other entity that already

29   provides a log-in procedure to access the entity's network, such log-in procedure could serve to

30   authenticate the user for the purpose of creating a new environment. It should be appreciated that

1   user authentication is not essential to carrying out the inventive principles. Moreover, although it
2   is contemplated that for ease of use (and to minimize programming) web browsers and web
3   pages be used to receive user-defined information to create each environment, other approaches
4   are of course possible.

5   In FIG. 13B, the user is prompted to create a new group by supplying a group name (e.g.,
6   "Joe's Homework") and a brief description of the group. This information is preferably stored in
7   a database file and associated with group members and functions available to those group
8   members.

9   In FIG. 13C, the user is prompted to identify group members. As described previously,
10 group members are preferably identified in one of three ways (or combinations of these): (1)
11 selection from a list of known group members; (2) inviting known candidates to join the group;
12 or (3) advertising for new members. When the user clicks one of the options in FIG. 13C, he or
13 she is prompted to supply additional information as shown in FIGS. 14A through 14C.

14 Beginning with FIG. 14A, for example, group members can be individually specified by
15 entering an e-mail address (e.g., an internal or external e-mail address) in a text form data entry
16 region and/or by selecting from a previously known list. This screen permits the user to compel
17 attendance in the group by specifying names and/or e-mail addresses to which group messages
18 will be sent. All those added to the group in this manner will be provided with access to the
19 environment corresponding to the group. Aliases and pre-defined groups could also be specified
20 as the basis for membership (e.g., all those in the accounting department of a corporation, or all
21 students in a high school).

22 Each member of a group might have a group email account, or they may use an off-
23 system email account. Off-system email addresses can be maintained in a database of users.
24 Mail sent to the group email address is preferably forwarded off-system, protecting the actual
25 email address of the person unless that person wishes to give out that address. New members can
26 be added until the group is completed. Although not explicitly shown in FIG. 14A, it is
27 contemplated that new members can be added to a previously defined group after the
28 environment has already been created.

29 When group members are selected or specified, the user creating the environment can
30 also create a password for each user in the group in order to enable those in the group to access

1 the environment. Alternatively, when a user visits the environment, the environment can retrieve

2 a "cookie" from the user's computer to determine whether the user is authorized to access the

3 environment. If no cookie is available, the user could be prompted to supply certain

4 authentication information (e.g., the company for whom he or she works, etc.) In yet another

5 approach, authentication could occur by way of e-mail address (i.e., when the user first visits the

6 environment, he or she is prompted to enter an e-mail address). If the e-mail address does not

7 match one of those selected for the group, access to the environment would be denied.

8 Turning to FIG. 14B, prospective group members can also be "invited" to join the group.

9 The user creating the environment can specify one or more e-mail addresses to which an

10 invitation will be sent. The invitation can be a simple text message, or it could be a more

11 sophisticated video or audio message. An expiration date can also be associated with the

12 invitation, such that responses to the invitation received after the date will not be accepted.

13 Software resident in web server 1201 (FIG. 12) receives responses to the invitations and adds

14 members to the appropriate group or drops them if the expiration date has passed or the

15 prospective group member declines participation. Prospective members can join the group by

16 sending a reply with a certain word in the message (e.g., "OK" or "I join"); by clicking on a

17 button in an e-mail message; or by visiting a web site identified in the invitation.

18 Turning to FIG. 14C, group members can also be solicited by creating an advertisement

19 directed primarily at potential group members that are unknown. The advertisement could

20 include, for example, a banner ad comprising text, video, and/or audio clips. The graphic should

21 conform to the size designated for the ad on the web page. The ad could be posted on a web site

22 by uploading the graphic through a web interface and, optionally providing a URL on the screen

23 of FIG. 14C to link to if the advertisement is clicked. Software on the group page can render

24 advertisements on a page either (a) every time the page is displayed, (b) in rotation with other

25 ads; or (c) when characteristics of the user match criteria specified for the ad.

26 The advertisement can include an expiration date after which responses would no longer

27 be accepted. Advertisements could range from the very specific (e.g., an advertisement posted

28 on a school's home page advertising participation in Joe's research project on drug use at the

29 school) to more general (e.g., an advertisement that says "we're looking for minority contractors

44

1 looking to establish a long-term relationship with us" that is posted on web sites that cater to the

2 construction industry.

3   A qualification option can also be provided to screen prospective group members. For

4 example, if an advertisement seeks minority contractors to participate on a particular construction

5 project, selecting the "qualify" option would screen responses by routing them to the user that

6 created the group (or some other authority) before the member is added to the group. Those

7 responding to the advertisement could be notified that they did not pass the qualifications for

8 membership in the group, or that further information is required (e.g., documents evidencing

9 qualifications) before participation in the group will be permitted. Alternatively, an automatic

10 qualification process can be provided to allow a prospective member to join if the person fills in

11 certain information on the response (e.g., e-mail address, birthdate that meets certain criteria, or

12 the like).

13   As shown in FIG. 15, a banner ad displayed on a web site invites minority contractors to

14 join a group that bids on information technology contracts. Those interested in the advertisement

15 click a button, which leads them to another site (not shown) requiring that they provide certain

16 information (qualification information, name, age, company registration information, etc.) This

17 information is then forwarded to web server 1201 which either pre-screens the information

18 according to pre-established criteria, or notifies the user creating the group that a prospective

19 member has requested access to the group. In the latter case, the user could screen the applicant

20 and grant access to the group.

21   FIG. 16 shows one possible user interface for selecting communication tools to be made

22 available to group members. This screen can be presented to the user creating the environment

23 after the group has been identified and its members selected. It is contemplated that a variety of

24 communication tools can be provided, including a bulletin board service; advertisements; white

25 pages (e.g., a listing of members, their e-mail addresses, telephone numbers, and the like); yellow

26 pages (e.g., a listing of services or companies represented by group members, with promotional

27 and contact information); document security (e.g., shared access secure document storage

28 services); anonymous e-mail (described above with respect to the first embodiment); threaded

29 dialogs; a group newsletter creation tool; videoconferencing; and even other user-provided

1 applications that can be specified by name and location (e.g., URL). Details of these services are

2 provided below.

3 According to various preferred embodiments, dynamic collaborative environments are

4 designed to integrate tools from multiple sources provided that they are web-accessible (i.e., they

5 operate according to Internet Protocol and/or HTML-type standards). The categories listed above

6 provide a reasonable taxonomy of the tools necessary for collaboration, but this list can be

7 extended to include virtually every class of software such as computer-assisted design,

8 engineering and financial analysis tools and models, office applications (such as word processing

9 and spreadsheets), access to public or proprietary databases, multimedia processing and editing

10 tools, and geographic information systems. The following describes some of the communication

11 tools that can be provided:

12 Bulletin boards. A bulletin board (see, e.g., FIG. 2) lists notices posted by group

13 members, which may be offers to buy or sell, but need not be limited to such offers. Many types

14 of bulletin board services are of course conventional and no further discussion is necessary in

15 order to implement one of these services. Nevertheless, in one embodiment the following data

16 items (attributes) can be provided for each notice appearing on the bulletin board: an item

17 number, a title, the date posted, and one or more special attributes defined by the user. The

18 attributes may include a field to indicate whether a listing is a "buy" or "sell" offer. The board

19 can be provided with an integrated sorting capability. By clicking on the heading of each

20 column, the user can sort the entries in, alternately, ascending or descending order. Thus, it is

21 possible to organize the records from oldest to newest or newest to oldest, or to separate buy and

22 sell offers. To limit the values on a board, a search capability can also be provided, such that

23 only those entries that meet the search criteria are displayed.

24 Advertisements. In a typical environment of a dynamically created network there are a

25 number of fixed places for advertisements – the top of a page for a banner, the bottom of a page

26 for a banner, and space on the side for small ads. The creator of the environment may choose to

27 use none, any, or all of these spaces for advertisements. Once a space is designated for

28 advertising, group members may place adds by completing a template that provides payment

29 information (if required), the text for the ad (any standard image format), and a link to be

30 executed if the ad is clicked by someone viewing the ad.

1   Each user is responsible for providing functionality behind the link.   The ad may be

2   displayed persistently (every time a page is displayed), in rotation with other ads for the same

3   place, or may be triggered on-the basis of user characteristics including purchasing history.

4   Revenue can be collected for placement (fixed price regardless of how many times an ad is

5   displayed), per time that the ad is displayed, or per click on the ad.   The virtual private network

6   provides the front-end to facilitate online placement of the ad. Display can be done by linking

7   pages to standard ad display code, available off the shelf from several sources. This code

8   provides for rotation of the ads.   Software for customization (i.e. choosing the ad based on user

9   characteristics) is available commercially from several sources.

10   White pages. White pages provide a comprehensive listing or directory of members with

11   information about them and information regarding how to contact them.   Various types of

12   commercially available software can be used to manage such directories, and it is elementary to

13   code typical directories that have fixed contents for each member.

14   A web-accessible directory can be used in accordance with various embodiments of the

15   invention.   One type of directory that can be provided differs from directories having fixed

16   structures.   The key differences are as follows:

17   (a) User control over information   Users enter and maintain their own information

18   directly, rather than through a central organization.   This provides more immediate update of

19   data and reduces transcription errors.   It makes it simple, for example, for people to change their

20   phone number when they are temporarily working at another location.

21   (b) Multiple points for quality control.   The data regarding each user can be displayed to

22   the user periodically (e.g.30, 60, and 90 days), and the user prompted to update and verify the

23   data.   A feedback capability can be provided for members of a group to report errors they find.

24   Email addresses can be "pinged" periodically to determine if they still exist. In addition, server

25   · management staff can periodically review accounts that have had recent activity.

26   (c) Object structure. A directory entry consists of a collection of data elements. These

27   elements include such things as name for addressing (Dr. John D. Smith), sort name (Smith, John

28   D), or primary work telephone (800-555-1212).   Traditional mail systems have a fixed number

29   of rigidly formatted elements.   In one embodiment, a more flexible approach can be used in that

30   individuals identify which elements they wish to add to the collection comprising their directory

47

1 entry. For example, a person can add 3, 4, 5 or more telephone numbers attaching a note to each

2 explaining its use (e.g. "for emergencies after 8PM").

3   (d) <u>Direct link to communications tools.</u> Where a directory refers to a contact method

4 (e.g. a telephone number), the method can be invoked directly from an entry if the necessary

5 software is available. For example, phone number can be dialed, email messages initiated, or a

6 word processing session initiated with letter and envelope templates, preloaded with address

7 information.

8   (e) <u>Descriptive information.</u> In addition to contact information, each directory can

9 contain information describing the entry (individual or business). The description can be

10 different in each group or it can be the same. The descriptive is free form, with the exception

11 that the user may drop in terms from a group-specific lexicon. This lexicon can include terms

12 specific to the industry (e.g. "fuel system") for the automotive industry, or preferred forms of

13 standard terms (e.g. "California" rather than "CA", "Ca", or "Calif."). Standardization of terms

14 in this way makes search the directory more reliable.

15   <u>Yellow pages.</u> Conventional "yellow pages" products provide a one level classification

16 of directory entries designed to facilitate identification of and access to an individual or

17 organization with specific interests and capabilities. Within industries, and particularly online,

18 multi-level hierarchical directories are common, with the multiple levels providing more precise

19 classification. There are numerous commercial products for maintaining online yellow page

20 type classification systems.

21   Any web-accessible directory can be connected to a DVPN group. A preferred method

22 offered with the system integrates the classification system with the descriptive field in a

23 directory entry. Every time a standard term pertaining to a classification is pulled from the

24 lexicon, the entry is added to that classification in the hierarchical sort. In addition to

25 hierarchical access, this correspondence between the traditional hierarchical sort and the free-

26 form description with standardized terms makes it possible to access records via search rather

27 than browsing the hierarchy. Searching makes it possible to identify an organization with

28 multiple capabilities (e.g. "brake repair" and "frame straightening"). This search capability is

29 much like a general web-search using a tool like AltaVista's or Inktomi's search engine and can

30 use the same search engine, but differs in that material being search is in a precisely defined

1 domain (group members), the information being searched is limited and highly quality controlled

2 (i.e. group directory entries), and has a precision rooted in a precise vocabulary (the lexicon used

3 in preparing the description).

4 Document repository. Any commercial web-enabled document repository can be

5 integrated into a group. Examples are Documentum and PC DOCs. An improved version

6 offered specifically with the DVPN package was described above.

7 ' Document security. Within the document repository various tools can be provided to

8 protect the security of documents. These include (1) limiting access to a document to certain

9 people or groups; (2) only displaying the directory entry for documents to people who can access

10 it; (3) password protection; (4) encryption; (5) secure archive in read only mode on a third-party

11 machine; (6) time-limited access and (7) a secure hash calculation.

12 All of the above are conventional except for time-limited access and the secure hash

13 calculation. Software for limiting access to a document to a certain period is available from

14 Intertrust, among others. A secure hash is a number that is characteristic of the document

15 calculated according to a precisely defined mathematical algorithm. There are several secure

16 hash algorithms, and implementers can develop their won. They are "trap door" in nature. That

17 is, the calculation can be performed with reasonable effort, but the inverse of the function is

18 computationally intractable. The classic example of a trap door function is multiplication of

19 very large prime number (on the scale of hundreds of digits). The product can be calculated with

20 relative ease, but factoring the product (the inverse function) is very time consuming, making if

21 effectively impossible with generally available hardware. This method is used in public key

22 encryption, but can be applied equally well in secure hash, though other trap door functions are

23 preferred, in particular, the one specified by the U.S. Department of Commerce as FIPS standard

24 180. Code to implement this standard can be developed from published algorithms.

25 Anonymous e-mail (described above with respect to the first embodiment);

26 Threaded dialogs. Threaded dialogs are a collection of messages addressing a specific

27 topic, added serially, not in real time. They are threaded in the sense that new topics can branch

28 off from a single topic, and topics can merge. According to one embodiment, threaded dialogs

29 differ from conventional news group functionality in that (1) users can initiate new topics; (2)

30 users can post a message to one topic, then indicate that the message pertains to other topic as

1 well; (3) browsers reading a message may continue down the original thread or one of the

2 alternates if other topics are suggested.

3 Group newsletter creation tool. A newsletter creation tool can be used to link columns

4 provided by multiple users (and maintained as separate web documents) into a whole through an

5 integrating outline maintained by an "editor". The purpose of the tool is to provide the look and

6 feel of an attractive single document to a disparate collection. To create the newsletter the editor

7 generates an outline identifying an author for each component and a layout. Art for the first

8 page can be provided. Through messaging, the authors are provided a link to upload their

9 content. Content is templated to include a title, date, a by line, one or more graphic elements, a

10 summary for the index, and text. The editor may allow documents to go directly to "publication"

11 or require impose a review and editing step.

12 Chat groups. Real time chat room software is widely available from many sources

13 including freeware and shareware.

14 Audio and videoconferencing. Commercially available tools for web-based audio and

15 video conferencing can be included in the group functionality. Examples are Net Meeting and

16 Picture Tel software.

17 FIG. 17 shows one possible user interface for selecting research tools to be made

18 available to group members. As shown in FIG. 17, various tools such as a mortgage calculator,

19 LEXIS/NEXIS access, news services, Valueline, and other research tools can be provided by

20 checking the appropriate box on the display. All of these research tools are conventional and

21 commercially available (via web-based links and the like).

22 FIG. 18 shows one possible user interface for selecting transaction engines to be made

23 available to group members. As shown in FIG. 18, many different types of transaction engines

24 can be provided to group members, including electronic data interchange (EDI) ordering; online

25 catalog ordering; various types of auctions; sealed bids; bid and proposal tools; two-party

26 negotiated contracts; brain writing (moderated online discussion) and online Delphi

27 (collaborative estimation of a numerical parameter). The following describes various types of

28 transaction engines in more detail. Enhanced features (i.e., those that differ from conventional

29 products) are highlighted in gray text.

1 A. Order placement (online catalog) transaction engine

2 An order placement or online catalog engine allows the buyer to place an order for a

3 quantity of items at a stated fixed price, essentially ordering from an online catalog. The catalog

4 contains the description and specification of the offerings. The catalog may be publicly

5 accessible (Subtype 1a) or provided for a specific customer (Subtype 1b). Prices are included in

6 the catalog but may be customer specific, may vary with quantity purchased, terms of delivery

7 and performance (e.g. cheaper if not required immediately). The catalog can represent a single

8 company's offering or an aggregate of the offerings from several companies. The catalog can

9 range from a sales-oriented web site designed for viewing by customers, to a engine designed

10 only accept orders sent via electronic data interchange (EDI). Note that the catalog can be

11 shopper oriented (i.e. designed to sell) or a simple, machine-readable list of available items and

12 prices. The following describes in more detail steps that can be executed to create an online

13 catalog:

14 1. Enter and maintain a framework for catalog

15   1.1. Enter / delete / edit categories. Categories are titles for groups of items, such as

16   "furniture" or "solvents"

17   1.2. Enter / delete / edit subcategories. Subcategories are categories within categories,

18   effectively establishing a hierarchy of products. Example: furniture/dining room/tables.

19   1.3. Create groups of categories and subcategories (e.g. "see also...."). The grouping allows

20   a person browsing items to be referred to another category that may contains items of

21   interest. For example, someone may reach the furniture/dining room/tables and then be

22   referred to furniture/office/conference room tables where other suitable tables may be

23   listed, or to furniture/dining room/chairs to buy chairs that make the table. This cross-

24   referencing transforms the hierarchical arrangement of categories into a web.

25 2. Enter / edit / delete items in catalog by entering and updating the information listed below.

26   The system allows users to enter this information and provides basic quality assurance.

27   2.1. Catalog item number

28   2.2. Supplier part number(s)

29   2.3. Name of item

30   2.4. Description

1 2.5. Photos and drawings

2 2.6. Specifications (depends on item type). Different items have different specifications. 3 For example, a computer printer can have color vs. black and white, dots per inch 4 resolution, paper size, etc. In contrast to a fixed, hard coded catalog, the 5 specification section of the general purpose catalog engine the user prepares the 6 specification section by selecting parameters from a list and then specifying a value 7 for that parameter. The parameter list contains values such as length, width, height, 8 voltage, color, resolution etc. It is can be extended by the manager of the auction 9 environment. A lister selects a necessary parameter (e.g. length, then enter the value, 10 such as 14"). The specification section is a concatenation of individual specifications.

11 2.7. First available date

12 2.8. Last available date

13 2.9. Category (categories) into which the item fits

14 2.10. Alternate suggestion(s) if product not available

15 2.11. Related and associated products (e.g. printer supplies for a printer or other household 16 items with the same pattern.

17 2.12. Additional information at the option of the individual or organization listing the item.

18 3. Enter / update pricing information

19 3.1. Simple price. The fixed prices is per item or per unit. The price must specify the

20 3.2. Pricing algorithm -- link to code for pricing algorithm

21 4. Take Orders

22 There are two variants: 4a: manual purchase in which a person browses a catalog and selects 23 and item for purchase and 4b: automated order in which a purchase is initiated by an 24 electronic message.

25 Variant 4a: Manual Purchase

26 4.1. Potential buyers access the catalog by drilling down through the category / subcategory 27 tree or

28 4.2. Buyers search fields in catalog to identify the appropriate item. The search may examine 29 the title, description, or any of the specification fields.

30 4.3. Display general information for item(s) meetings specifications

1   4.4. Allow user to modify search or to select specific item if the items displayed to do not

2   meet his requirements

3   4.5. Display detailed information for selected item

4   4.6. Display the fixed price or calculate price if prices is based on an algorithm. The pricing

5   algorithm may include parameter such as characteristics or affiliation of the users (e.g.

6   affiliated with a pre-negotiated discount program) , delivery date and mode, and quantity.

7   4.7. Offer the option to purchase or search again if they choose not to purchase.

8   4.8. If the buyer opts to proceed with the purchase, then check the availability of the item by

9   linking to the sellers inventory system

10   4.8.1. If the item is available then execute an 'add to basket'. That is, place it on a list

11   of items designated for purchase.

12   4.8.2. If the item is not available, then execute the contingent response:

13   4.8.2.1.   Offer delivery at predicted date

14   4.8.2.2.   Terminate the sale, but offer to deliver or notify when next the item is next

15   available.

16   4.8.2.3.   Suggest alternate items

17   4.8.2.4.   Report 'sorry' and abort transaction

18   4.9. Offer option to purchase addition options

19   4.9.1. If offer is accepted, execute from step 4.1

20   4.9.2. If offer is not accepted, proceed with step 4.10

21   4.10.   Conclude the transaction

22   4.10.1. Collect shipping information, offer options

23   4.10.2. Collect payment information

24   4.10.3. Validate payment

25   4.10.4. Summarize order

26   4.10.5. Obtain final authorization

27   4.10.6. Generate receipt

28   Variant 4b: automated order, done using an EDI (electronic data interchange) message

29   4.1 Accept requests for item

30 4.2   Return price and confirmation of availability

1   Note that users may conduct transactions without employing EDI. It is possible, however,

2   for members to agree on a transaction EDI format either by completing a template within the

3   system or selecting a pre-established EDI format from a library. This library can include formats

4   developed by recognized standards organizations (e.g. UNEDIFACT or ANSI) or formats

5   developed specifically for an industry or a trading environment. Once there is agreement on a

6   format, transactions can be initiated, concluded, and confirmed through the exchange of

7   appropriate EDI messages. As many commercial ordering, accounts payable, accounts

8   receivable and enterprise resource planning systems have an EDI interface the collaborative

9   environment should have the capability to forward the message to the order fulfillment system.

10   B. English Auction Transaction Engine

11   In an English Auction, a single item is offered for sale to many buyers. The auction can

12   be open or limited to pre-qualified bidders. The buyers offer bids in turn, each succeeding all

13   prior bids. The highest bid received at any point in the auction is visible to all buyers. The

14   identity of the highest bidder may or may not be visible to traders. Buyers may increase their

15   bids in response to this information. Award is to the highest bidder at the end of trading. The

16   end of trading is reached when there are no higher bids during an interval that may be formally

17   defined or determined by the manager of the auction at the time of execution.

18   There are two models for the access to the transactions. In the first model, all buyers and

19   sellers are members of the group. In the second model, all sellers are members of the group, but

20   buyers can include members and non-members. If non-members are allowed to buy, the creator

21   the transaction must enter a new URL for buyers. This is a sub-URL of the main group URL. A

22   registration process may be established for the buyer URL.

23   In live auctions (as opposed to online) all traders are connected at the same time, and the

24   duration of the auction is brief – typically only a few minutes. In online trading, it is not

25   necessary for all of the bidders to be present (i.e. connected at the same time). To distinguish

26   between these two options they are designated (a) concurrent (everyone bidding at the same time)

27   and (b) batch (not everyone connected simultaneously. The manager of the auction can set the

28   minimum bid and the minimum increment.

29   1. The first step in conducting an auction is to collect information on the items being offered for

30   sale. This is done online. The information collected includes:

54

1.1. Identity of seller. Note that the business rules of the auction may require advance registration of sellers to verify their identity.

1.2. Descriptions, optionally including attachments and photographs, independent certifications or appraisals, and anything else in digital form necessary or useful in determining the value of the item.

1.3. Reserve price

1.4. Minimum increment

1.5. Time offered for sale

1.6. Time bidding is scheduled to end

1.7. Verify the seller's consent to the rules of the auction house regarding delivery, payment, responsibility for non payment, etc.

2. If the business rule of the auction house is to require payment up front, collect payment either by:

2.1. Debiting a deposit account

2.2. Charging to account for billing

2.3. Collecting online payment such as through a credit card.

3. Post information about auction, including:

3.1. Description of items to be auction

3.2. Auctions rules:

3.2.1. Qualification process for bidders

3.2.2. Time of bidding

3.2.3. Criterion for ending bidding – time between bids

3.2.4. Legal statement – responsibilities of buyer and seller, limitation of liability

4. Execute qualification process (optional)

4.1. Admit bidders who are qualified based on past participation

4.2. Provide fill-in-the blank qualification form new bidders

4.3. Collect information

4.4. Conduct automated review or manual review

4.5. Inform prospective bidder of qualification or not

Variant (a): concurrent auction

1   5.   Conduct Auction

2   5.1. Fifteen minutes prior to appointed time for auction, display "Welcome" screen with

3   space for qualified bidder to enter an alias or handle to be used in the auction. Screen

4   should have a description of the object. Show time until auction starts. Auto refresh at

5   15 second intervals.

6   5.2. At appointed time, display the main auction page with the following information:

7   5.2.1. Description / picture of item for auction stored in a separate, static frame of the

8   PC so that it does not need to be downloaded each cycle.

9   5.2.2. Current bid (initially the reserve price)

10   5.2.3. Suggested next bid (e.g. current + 3 * increment)

11   5.2.4. Button to accept suggested next bid

12   5.2.5. Field to enter bid higher than suggested next

13   5.2.6. Handle of the highest bidder

14   5.3. Refresh main auction page at 15 second intervals

15   5.4. Collect bids, either

16   5.4.1. Notice that the suggested bid was accepted

17   5.4.2. Bid higher than accepted bid

18   5.4.3. If new bid is lower than current highest, disgard

19   5.4.4. If higher than current highest then

20   5.4.4.1.   Log identity of highest bidder

21   5.4.4.2.   Update highest bid

22   5.4.4.3.   Update next suggested bid

23   6.   If nobody accepts the suggested bid, then

24   6.1. Reduce suggested next bid

25   6.2. If accepted, resume normal sequence

26   6.3. If not accepted, reduce suggested next bid

27   6.4. If accepted, resume normal sequence

28   6.5. If not, begin close

29   6.6. "Going once ...", if response, resume normal sequence, else

30   6.7. "Going twice ..." if response, resume normal sequence, else

1   6.8. Done. Display closing screen

2   7. Settle with winning bidder, two models

3   7.1. Connect buyer to seller for direct settlement

4   7.2. Collect money from buyer, deduct fee, convey amount to seller

5   Variant (b): batch (i.e. time limited) auction

6   Conventional on-line batch (time limited) auctions are common. E-bay is the most

7   prominent example. This process description continues from step 4 of the English auction

8   description as the startup of the concurrent and batch auctions are the same.

9   5. Conduct auction: Until closing time for an item:

10   5.1. On entry to system display the following for the potential buyer:

11   5.1.1. Latest listing

12   5.1.2. Categories

13   5.1.3. Search screen

14   5.2. On selection of categories:

15   5.2.1.   Execute dill down

16   5.2.2.   Retrieve count of items that meet criteria

17   5.2.3.   If more count is less than 25 (or other small number (n) consistent with the

18   layout of the screen) retrieve all items that meet criterion

19   5.2.4.   If count is more than n, retrieve n auctions with nearest expiration time

20   5.2.5.   Display link list to all items in list, sort order should be auction with

21   nearest deadline to most distant

22   5.2.5.1.   Item name

23   5.2.5.2.   Time till end of auction

24   5.2.5.3.   Highest current bid

25   5.2.6. On user selection of the item, display same information as above plus

26   5.2.6.1.   Description

27   5.2.6.2.   Photo (if any)

28   5.2.6.3.   Attachments (if any)

29   5.2.7.   If count is more than n, display further drill-down options as well as item

30   information above

1   5.3. Accept new bid through the display screen

2   5.3.1. Log bids in order, reject if bid is not higher than last high bid by increment.

3   5.3.2. If bid is rejected, tell bidder that their bid is not sufficient

4   5.3.3. Update database recording highest bid, bidder, time of bid

5   5.3.4. Display screen to user to confirm that their bid is the highest

6 6. When the time limit is reached, determine if a new bid has been received in the last 3 minutes

7   (or other short time period). If so, extent the bidding time by 3 minutes (or other short time

8   period) and execute step 5 with a new closing time.

9 7. When the time limit is reached, including all extensions under step 6, then

10   7.1. Email message to highest bidder that they won

11   7.2. Add transaction to completed deals

12   7.3. Update splash and add screens

13   7.4. Settle with winning bidder-- two models:

14   7.4.1. Connect buyer to seller for direct settlement

15   7.4.2. Collect money from buyer, deduct fee, convey amount to seller

16   C. Dutch Auction Transaction Engine

17   A Dutch auction, like a standard auction, involves the sale of a single item or batch with

18 fixed specifications. There is one seller, and many potential buyers. The seller sets the prices,

19 ideally higher than any buyer's maximum bid price. The offered price is reduced by a fixed

20 increment at fixed intervals until a buyer accepts the price. The purchase goes to the first buyer

21 in to accept the price. In the physical world (as opposed to the online world), Dutch auctions are

22 rarely if ever run concurrently. In a live trading room, it could be difficult to determine which

23 buyers was first to commit to a price when several are willing to pay the same amount. The

24 Dutch auction is relatively simple to implement in an electronic environment. There are, at

25 present, no online Ducth Auctions of which the inventors are aware.

26 1. Enter and maintain a framework for catalog

27   1.1. Enter / delete / edit categories. Categories are titles for groups of items, such as

28   "furniture" or "solvents"

29   1.2. Enter / delete / edit subcategories. Subcategories are categories within categories,

30   effectively establishing a hierarchy of products. Example: furniture/dining room/tables.

1.3. Create groups of categories and subcategories (e.g. see also....). The grouping allows a person browsing items to be referred to another category that may contains items of interest. For example, someone may reach the furniture/dining room/tables and then be referred to furniture/office/conference room tables where other suitable tables may be listed, or to furniture/dining room/chairs to buy chairs that make the table. This cross referencing makes transforms the hierarchical arrangement of categories into a web.

2. Execute qualification process (optional)

2.1. Admit bidders who are qualified based on past participation

2.2. Provide fill-in-the blank qualification form new bidders

2.3. Collect information

2.4. Conduct automated review or manual review

2.5. Inform prospective bidder of qualification or not

3. Collect information on items to be auctioned and owners, including

3.1. Identity of seller

3.2. Descriptions, optionally including attachments and photographs, independent certifications or appraisals, or other information necessary to establish the value of the tiem

3.3. Categorization

3.4. Starting price

3.5. Increment, Interval for reduction

3.6. Minimum price

3.7. Obtain consent to rules (possibly as part of registration/qualification process)

3.8. Collect to conduct auction if item is

3.9. Calculate time to take item off auction by determining the number of steps (intervals) necessary to reduce price from the starting price to the minimum

3.10. Record all of the above information in the Dutch auction database

4. Cull expired options

4.1. Search database periodically for items where current time is later than time to take item off auction (2.9)

4.2. Inform owner that item was not sold

1   4.3. Delete entry from database

2   4.4. Prompt for revised terms start of another auction, create new entry if user takes option

3   5. When the buyer enters the system display a list of high level categories, a prompt for search

4   criteria, and/or a link to a search page.   Allow user to drill down through categories or enter

5   search parameters.

6   5.1. Retrieve count of items that meet criteria

7   5.2. If more count is less than 25 (or other small number (n) consistent with the layout of the

8   screen) retrieve all items that meet criterion

9   5.3. If count is more than n, retrieve n auctions with nearest expiration time

10   5.4. Display link list to all items in list, sort order should be auction with nearest deadline to

11   most distant

12   5.4.1. Item name

13   5.4.2. Time till end of auction

14   5.4.3. Current price:

15   5.4.3.1.   Retrieve starting price (SP) and increment (I$)

16   5.4.3.2.   Calculate number of intervals since start of auction (INT)

17   5.4.3.3.   Determine price = SP − (INT * $)

18   5.5. On click, display same information as above plus

19   5.6. Description

20   5.7. Photo (if any)

21   5.8. Attachments (if any)

22   5.9. The display screen should include a button that allows the buyer to purchase the item at

23   the selected price.

24   6. When the user clicks the "buy" button

25   6.1. Email message to highest bidder that they won

26   6.2. Add transaction to completed deals database

27   6.3. Settle with winning bidder-- two models:

28   6.3.1. Connect buyer to seller for direct settlement

29   6.3.2.   Collect money from buyer, deduct fee if any for auction and payment

30   services, convey the remainder to seller.

D. Reverse English Auction Transaction Engine

1   In a reverse auction, there are multiple buyers to one seller. Prices come down rather
2   than up. There are many variants of a reverse auction. The variant discussed here is a reverse
3   English auction. Reverse auctions have been implemented on line in Open Markets.

    The process for posting an item for bid and for qualifying bidders is the same as for other
auctions. The difference here is that the buyer may optionally set a maximum price.

1. Accessing the list of items sought

    Potential bidders access items sought by working through a hierarchy of categories and subcategories or entering search criteria, as for other auctions. A list of items within the category/subcategory and/or meeting the search criteria is displayed. The user may then

    1.1. Terminate the session on finding no suitable items

    1.2. Revise the search criteria

    1.3. Select an item on which to bid

2. If the user selects an item on which that may wish to bid, detailed information about the items is displayed. This item may include the following information:

    2.1. Name

    2.2. Seller

    2.3. Description

    2.4. Detailed specifications for items

    2.5. Delivery requirements

    2.6. Proposed terms

    2.7. Current low bid

3. If the user determines that they should bid, he accesses the bid entry screen from the detailed description in Step 2 above. Making a bid consists of entering the following information:

    3.1. New, lower bid

    3.2. Comments pertaining to any special terms, features, or conditions

    3.3. Attachments containing relevant additional information and any certifications required
        by the buyer

4. On receipt of bid, there are two options – either all bids are accepted, or bids are accepted only after review of information by the buyer.

1   4.1. Case 1: all bids are accepted

2   4.1.1. New bid is checked to determine if it is lower than prior bid

3   4.1.2. If so, then

4   4.1.2.1.   bidder is notified that their bid is currently the lowest

5   4.1.2.2.   seller is notified of new low bid

6   4.1.2.3.   bid database is updated

7   4.1.3. If not, then

8   4.1.3.1.   Bidder is notified that their bid is not the lowest

9   4.1.3.2.   Bid screen is displayed so that bidder may lower bid

10   4.2. Case 2: bids are accepted after review by buyer

11   4.2.1. Buyer is notified of bid via email or online message

12   4.2.2. Buyer accesses complete information on the proposed bid through the system

13   4.2.3. Buyer select accept bid or reject bid.

14   4.2.4. If bid is accepted, then

15   4.2.4.1.   Bidder is notified that their bid is currently the lowest

16   4.2.4.2.   Bid database is updated

17   4.2.5. If bid is not accepted, then

18   4.2.5.1.   Buyer enters reason for not accepting bid

19   4.2.5.2.   Bidder is informed that bid is rejected with reason stated above

20   4.2.5.3.   Bidder may access the bid screen to revise offer

21 5. When time period has expired and there have been no bids within a short specified interval,

22   then

23   5.1. If at least one bid less than the maximum has been received, then:

24   5.1.1. Notify low bidder that their offer was successful

25   5.1.2. Add transaction to completed deals database

26   5.1.3. Settle with winning bidder-- two models:

27   5.1.3.1.   Connect or introduce buyer to seller for direct settlement

28   5.1.3.2.   Collect money from buyer, deduct fee if any for auction and payment

29   services, and convey the remainder to seller.

30 .   5.2. If no bid less than the maximum has been received, the

1   5.2.1. Notify buyer

2   5.2.2. Allow buyer to revise bid criteria

3   E. Sealed Bid Transaction Engine

4   In a sealed bid system, the buyer publishes or distributes detailed, fixed specification to a

5 number of potential bidders (who may or may not be prequalified). Bidders submit binding bids

6 by a specified deadline, in a specific format that allows ready comparison. The competitive

7 bidding process is distinguished from the bid and proposal process by the complexity of the

8 specifications and the bids. In a simple competitive bid, competition among the bidders is along

9 one or two readily quantified dimensions (always including price) and there is little or no room

10 for variation in the form or specifications of the offering. Comparison of the bids is elementary.

11   The process for posting an item for bid and for qualifying bidders is the same as for other

12 transactions as is the method to identify items on which to bid either using the hierarchy of

13 categories and subcategories or a search engine.

14 1. If the user selects an item on which he may wish to bid, detailed information about the items

15   is displayed. This item may include the following information:

16   1.1. Name

17   1.2. Seller

18   1.3. Description

19   1.4. Detailed specifications for items including all information necessary to prepare a bid

20   1.5. Bid instruction including specification for any documentation the buyer may required

21   with a bid (e.g. proof of bonding or license)

22   1.6. Notice of any fees for bid registration

23   1.7. Delivery requirements

24   1.8. Proposed terms

25 2. After review of the bid requirements, the user may choose not to bid or may enter a bid. The

26   process for entering a bid consists of preparing a bid package, including the price offered and

27   any necessary supporting documentation. This is done by completing an online form, with

28   provision for attachments. The bid is submitted through the system where it goes into a

29   database of bids that are not opened to the closing time for the bidding process.

30 3. At the closing time, all bid packages are conveyed to the buyer.

1   3.1. If there are no bids, the buyer is offered the opportunity to revise the request for bids.

2   3.2. If there are multiple bids, the buyer reviews the bids and selects the lowest priced

3   qualifying bid. They buyer informs the seller and arranges payment and delivery in

4   accord with the terms stated in the bid package.

5   F. Order Matching Transaction Engine

6   In an order-matching system there are many potential buyers. Each posts binding offer to

7   buy (bid amount) or sell (asked amount). The process proceeds in real time. The order

8   matching system constantly compares bid and asked and, when a match is found within a

9   specified spread, the deal is concluded. No accepted offer can be repudiated, but offers may be

10   withdrawn before a deal is consummated. The strike price is posted so that buyers and sellers

11   can modify their offerings in real time. The items traded are fungible so that price is the only

12   decision. For the market to operate efficiently the items traded must be tightly defined and the

13   terms of sale must be fixed and determined in advance. This is typically done by the operation

14   or an exchange, with the order-matching engine operating in the background. To insure that the

15   items traded are well defined, and the terms of sale are rigid example of an order matching

16   process in stock trading on an exchange.

17   Users of an order-matching engine are all potential buyers and seller. They are qualified

18   in advance using a process like that outlined by for auction with the extension that deposit

19   accounts are frequently required given the speed of transactions in exchange environments.

20   1. Establish and maintain items to be traded. All functions in this category are reserved to the

21   manager of the exchange or a designee.

22   To add (i.e. "list" and idem), enter

23   1.1. Unique item number or symbol

24   1.2. Description of item (e.g. Sears Class A Common Stock)

25   1.3. Terms and conditions ownership (e.g. who can own) if any

26   1.4. Trading units (e.g. shares, blocks, etc.)

27   1.5. Additional information as required by the rules of the exchange

28   To delete (i.e. "delist" and item)

29   1.6. Select the item to be deleted

30   1.7. Confirm deletion

2. On entry to the system, potential buyers and sellers can review the price of the last transaction of any item, either through a list or a search by item name or symbol. The current highest asked and lowest bid price are also shown.

3. An offer to sell is posted by entering the following information:

    3.1. Item number or symbol

    3.2. Quantity offered

    3.3. Proposed price ("asked")

    3.4. Seller

    3.5. Offers may be revise at any time prior to consummation of a deal

4. An offer to buy is posted by entering the following information

    4.1. Item number or symbol

    4.2. Quantity offered

    4.3. Proposed price ("asked")

    4.4. Buyer

    4.5. Offers may be revised at any time prior to consummation of a deal

5. Offers to buy and sell are constantly reviewed by the software. When there is an offer to buy and sell at a price within a preset difference. When prices match, buyers and sellers are notified of the transaction, and the transaction is recorded. The display of the last transaction price, the highest bid and the lowest asked price is updated.

6. The transaction is conveyed to the backend accounting system of the exchange.

    G. Bid and Proposal

    The bid and proposal process is typically used for procurement of large or complex products or services, in which cost is not the only factor. Cost must be weighed against the buyer's assessment of the quality and suitability of an offering and the ability of the bidder to deliver the product or perform the specified services. The bid and proposal process is conducted between one buyer (possibly representing a consortium) and many potential sellers, sometimes organized into teams. The buyer issues specifications that may be general or highly specific, brief or very lengthy. The specifications may be distributed freely or to a list of qualified buyers.

With physical RFPs, the size and the associated cost of distribution make it common practice to advertise the availability of the RFP first, sending copies only to those that request it. Frequently, the requestors are required to supply information to establish their qualifications to bid. While cost is not an issue in electronic dissemination of RFPs, the model of advertising prior to distribution is still useful in managing the qualification process. This is addressed as variant (a) is this description. Variant (b) requires no prequalification.

In a competitive bid on fixed requirements (sealed bid or auction), there is typically very little communication between buyer and seller between publication of the request and submission of the bids. The requirements are comparatively simple, clear, and unambiguous. In contrast, the bid and proposal process may involve considerable communication between buyer and seller. The process may begin with a bidders' conference to answer questions about the requirements. Additional questions from bidders may be accepted, though not all need be answered. Questions and answers may be made available to all bidders or the response may be in private. This dialog is crucial for two reasons. First, it helps the bidders understand the requirements and to be responsive in their bids. Second, it is not unusual for the bidders' questions to identify some point of ambiguity, error, or contradiction in the specifications, leading to a modification of the RFP. The diverse perspectives of the bidders, and the close attention required on their part to prepare a bid inherently provides an excellent review of the RFP.

The initial phase of the RFP process concludes with submission of the bids, but this is far from the conclusion of the process. Commonly, questions arise from the review of the proposals. These may relate to a specific submission or have broader implications, leading to modification of the requirements. The list of bidders can be culled to the best candidates. These are asked to answer questions about their proposals and to provide additional and clarifying information.

The process described here is built around the document repository described elsewhere in this application. Through this process of refinement, the list of bidders is narrowed to one or two with whom a contract is negotiated. The process of negotiation is addressed as a separate transaction type (Negotiation Engine) as it may be conducted without the bid and proposal process.

Variant (A): with pre-qualification

1. Software supports the user in creating a web site for the proposal process. Initially this site manages the process for requesting the request for proposal (RFP), qualifying bidders, and disseminating the RFP.

2. Supported by the system software, the bidder creates and RFP advertisement by

    2.1. entering a summary of the RFP.

    2.2. entering a summary of the information needed to qualify as a bidder or

    2.3. attaching a form (HTML web page or template for paper form) for entering qualifying information

3. The RFP advertisement includes file transfer software for uploading qualifying information to the repository.

4. Disseminate RFP advertising

    4.1. Post on public bulletin board or

    4.2. Disseminate via mail to selected users

5. When users access the system, issue them an encryption key and PIN to be used for subsequent uploads and communications to verify their identity.

6. Receive requests for RFP in repository

    6.1. Prompt for key

    6.2. Encrypt submission

    6.3. Upload

    6.4. Generate receipt – should include an authentication number

7. Disseminate RFP to selected user, either:

    7.1. Attach to return Email or

    7.2. Post the RFP in a repository from which qualified prospective bidders may download the file. If the repository model is used, provide notice of the posting via email including any necessary PINs and codes to access the repository

    7.3. When a prospective bidder downloads an RFP, issue an encryption key to be used in submitting proposal

8. The RFP site also includes a page through which prospective bidders can submit questions. Questions and answers are posted to the site.

9. Updates to the schedule and amendments to the RFP are posted to the site

1   10. All access to the site is recorded to verify that prospective bidders have received critical

2   information.   Direct contact may be used when it is determined that a bidder had not

3   accesses the site since critical new information was posted.

4   11. Bidders prepare their proposal and then upload them to a repository for proposals using

5   software built into the proposal site.

6   11.1.   Prompt for key

7   11.2.   Encrypt submission

8   11.3.   Upload

9   11.4.   Generate secure hash number to prevent tampering with the submission

10   11.5.   Generate receipt including secure hash number and authentication code

11   12. After initial proposals are received, the process moves into a phase commonly termed the

12   "best and final process" in which the proposals are reviewed, the list narrowed, and the

13   proposals refined.

14   12.1.   Create separate secure environment (i.e. web site with repository) for each

15   respondent

16   12.2.   Exchange materials through repository (described elsewhere in this filing)

17   12.3.   Records and receipt each access

18   12.4.   Generate key for revised proposal

19   12.5.   Receive proposal using process in 11

20   12.6.   Repeat from step 11 as many times as necessary

21

22   The remainder of the process is completed as a negotiated deal, described below.

23   Variant B: no pre-qualification:

24   Proceed as above, beginning with Step 6 and not requiring a key for download of the RFP.

25   H. Negotiation Deal Engine

26   An engine for negotiating a deal can be built around the capability of the system to create

27   a temporary virtual private network through the web. A temporary network is created for the

28   negotiation. Access to the network is limited to the parties of the negotiation, their advisors and

29   counsel, and, potentially, arbitrators and regulators. The members of the negotiating environment

30   have access to the complete set of tools described in this filing including those for

1 communications (email, anonymous mail, online chat, threaded dialogs, and audio and video

2 collaboration), the library of standard contract instruments, the tools for document signature and

3 authentication, and the document repository. Using these tools in a secure environment they can

4 negotiate, close, and register a deal.

5 FIG. 19 shows one possible user interface for selecting participation engines to be made

6 available to group members. The term "participation engine" refers generally to collaboration

7 tools that provide features beyond merely communicating among group members. Various

8 services such as an on-line survey tool, a DELPHI model tool; brain writing tool; and real-time

9 polling can be provided.

10 A. Online Survey

11 In online polling or surveying, the person creating the poll uses and automated tool (new

12 to this application) to build simultaneously an online questionnaire and a database to collect the

13 results. The user builds the questionnaire by entering a series of questions and an associated

14 data collection widget for each. The polling tool builds the database and the data entry screen.

15 The data entry screen consists of two columns. The left column is a series of questions. The

16 right column is the data entry tool appropriate to the question. Various data entry tools can be

17 provided to respond to the query, including such things as:

18 1. yes / no radio buttons

19 2. true / false radio buttons

20 3. slider with scale from 1-5, 1-10, etc.

21 4. fill-in-the-blank text box

22 5. numeric field

23 6. multiple check boxes (e.g. strongly disagree, disagree, agree, strongly agree)

24 Other data entry types may be added.

25 As each question / data collection widget is added, the polling tool creates the database.

26 The database includes one record per data collection form. Creating the database structure

27 simply means adding one new field to each record definition for each question. The type of data

28 collection widget defines the format of the field, as follows:

29 1. yes / no radio buttons: one character field, limited to "y" or "n"

30 2. true / false radio buttons: one character field, limited to "y" or "n"

1   3.   slider: real number field, with appropriate range check

2   4.   fill-in-the-blank text box: text box

3   5.   numeric field: real number or integer

4   6.   -multiple check boxes: integer field with range check from 1 to number of boxes

5   Every data entry screen provides a "save" and "cancel" button.   Save writes to the database.

6   Cancel exits the entry screen without saving.

7   The survey, once composed as described above exists as a web page.   This page can be

8   embedded in web applications.   It can be made available on a site available to the entire Internet,

9   on an Intranet, or in a dynamically created environment.   Alternatively, it can be distributed via

10   e-mail.   When the form is completed, the submit button transmits the value entered to the

11   database that is created at the time the form is generated.   Access to the database is controlled by

12   the rules of the database system.   It may be limited to the individual who creates the survey

13   form and database, but it may be accessible other users in the survey developers organization, as

14   determined by the database administrator.   Distribution of the result of the analysis is at the

15   discretion and control of the individual managing the survey.   This manager may be the

16   individual who creates the survey, but the actual creator may be acting on behalf of the survey

17   manager.   Results may be kept private, posted to the Internet, and intranet, or a collaborative

18   environment, distributed via e-mail within an organization, or, if the information is available,

19   sent via e-mail to the participants in the survey.

20   B. Online Delphi Engine

21   -   The online Delphi engine allows real-time collaboration in estimating or predicting an

22   outcome that can be expressed numerically.   For example, the method can be used to develop a

23   consensus forecast of grain prices.   The method has been in used since the 1970s, but has not

24   previously been adapted to online processes. One possible method is as follows:

25   1. Establish the session

26   1.1. Within an online community, the moderator of the session creates the brain writing

27   session by entering the following information:

28   1.1.1. Name of moderator

29   1.1.2. Title of the session

30   1.1.3. Description of the session

1   1.1.4. Background reading as references or attachments

2   1.1.5. Start date for the session

3   1.1.6. Scheduled end for the session

4   1.1.7. Access to the session:

5   1.1.7.1.   URL for access

6   1.1.7.2.   Open to all or invitees only for observation

7   1.1.7.3.   Open to all or invitees only for participation

8   1.1.8. Payment information if required

9 2. Optionally, the session may be advertised on line

10 3. If the session is private, invitations with logon keys must be distributed via email, actual

11   mail, or download.

12 4. Optionally, the moderator may run on online applications and qualification process

13 5. Prior to the start of the session, the moderator must describe precisely the value to be

14   estimated. The definition must be completely unambiguous.

15 6. Each participant connects at the start of the session. On connecting, they question is posed

16   (e.g. "What will be the price of West Texas intermediate oil in December?")

17 7. Each participant enters a number a brief (1 paragraph maximum) explanation of their

18   reasoning.

19 8. When the participant is done entering their estimate, they click "Done".

20 9. Each participant's estimate and explanation is recorded.

21 10. Each participant then sees the summary screen.

22 11. Estimates are arrayed graphically from top to bottom of the screen, from lowest to highest.

23   The value is stated as is the associated comment, but the source of the comment is not

24   revealed.

25 12. Participants can review the estimates and comments, send an anonymous message to the

26   author or any comment, or amend their answers.

27 13. The session terminates when the time expires, or when the moderator determines that there it

28   is no longer appropriate to continue. The operator may determine this is based on declining

29   participation or, if participation is high, the moderator may extend the deadline.

1   14. Participants and observers may access the final display of estimates, again arrayed from top

2   to bottom, lowest to highest.

3   C. Brain Writing

4   Brain writing is a variant of a method for facilitated group discussion termed

5 brainstorming.   The objective of brainstorming is to maintain the focus of the discussion while

6 encouraging creative input and recognizing the contributions of all members of the group. It

7 seeks to avoid problems with a few individuals dominating the discussion, with junior staff

8 deferring to senior staff, and with new ideas being abandoned before than can be developed fully.

9 Brain storming has been commonly used since the late 1960s. Brain writing is a more intense

10 method that relies on joint writing rather than discussion.   What is presented here is adaptation

11 of that method to an online environment. It is believed to be the first such adaptation.

12 1. Establish the session

13   1.1. Within an online community, the moderator of the session creates the brain writing

14   session by entering the following information:

15   1.1.1. Name of moderator

16   1.1.2. Title of the session

17   1.1.3. Description of the session

18   1.1.4. Background reading as references or attachments

19   1.1.5. Start date for the session

20   1.1.6. Scheduled end for the session

21   1.1.7. Access to the session:

22   1.1.7.1.   URL for access

23   1.1.7.2.   Open to all or invitees only for observation

24   1.1.7.3.   Open to all or invitees only for participation

25   1.1.8. Payment information if required

26 2. Optionally, the session may be advertised on line

27 3. If the session is private, invitations with logon keys must be distributed via email, actual

28   mail, or download.

29 4. Optionally, the moderator may run on online applications and qualification process

5. Prior to the·start of the session, the moderator must list some number (typically 5-10) of questions or hypotheses to be explored. (e.g. " Our company should create a spinoff to develop and commercialize the new breast cancer vaccine") This may be done by the moderator alone, in consultation with the participants, or with other outside the session.

6. Each question or hypothesis becomes a "Card".

7. Participants may enter the session any time after the start. A password may be required if the session is not open.

8. On entry into the system, a user if given a card at random. The card consists of the initial question or hypothesis plus all comments entered on the card by other participants.

9. After reviewing the card, the participant may add his or her own comments to the bottom. After entering comments, the participant clicks "Done" to return the card to the pile.

10. When a participant returns a card to the pile, they received another card, chosen at random (preferably) or selected by the user. This process continues until the opt to exit. They may reenter at any time up to the conclusion of the session.

11. When a card is returned to the pile, it is become available for assignment to the next participant. The card includes the additions of the most recent participant.

12. A participant may opt to return the card without addition if he or she has nothing to add.

13. Participants may create new cards when new ideas come to mind. These are treated in exactly the same way as original cards.

14. Observers may view any card but may not add to them.

15. The moderator may limit participation to a set number at any time so that there is a sufficient number of cards to keep the participants fully occupied.

16. The session terminates when the time expires, or when the moderator determines that there it is no longer appropriate to continue. The operator can determine this based on declining participation or, if participation is high, the moderator may extend the deadline.

17. The raw cards are distributed at the conclusion to all participants. The moderator or another individual is charged preparing a summary and arranging follow-up.

FIG. 22 shows one possible scheme for storing brain card writing data elements. In accordance with one embodiment, each brain writing card comprises a data structure including the following elements:

1.   Brain writing session number: Serially assigned number to differentiate brainwriting sessions. A session is the set of all cards pertaining to a particular topic.

2.   Card number: A Serially assigned sequence number

3.   Initial Comment : The question or comment used to initiate the discussion (e.g. "SAIC should purchase a company that produces Internet server software"

4.   Date and time card started

5.   Date and time card closed

6.   Comments: A collection (i.e. a set of unlimited length) containing the comments added by participants in the brainwriting session.

7.   Date of additional comment: Date and time that each additional comment was added.

8.   Commenter: Name or user ID of the person adding each additional comment. Ideally, brainwriting should be anonymous to encourage open dialog. Accordingly, this field may be omitted from an implementation. Some organizations, however, may wish to track this information without making it visible to users, or in some cases to attribute comments.

When the user has finished defining the group and specifying its functions, environment generator 1201a (FIG. 12) creates an environment accessible to the group members and including the functions specified during the environment definition process. As shown in FIG. 20A, for example, a web page can be created for the newly created environment, including those functions that were selected by the user that created the group. All group members are notified of the existence and location of the environment, and each group member can use the functions provided in the environment to collaborate on a project or conduct business.

FIG. 20B shows what an environment might look like to a group member after entering the environment. As shown in FIG. 20B, for example, a news banner announces the latest news for the group. Additionally, specific communication tools, research tools, transaction engines, and participation engines are made available to group members, which can be executed by appropriate mouse clicks in accordance with the inventive principles. According to various inventive principles, each tool shown on the web page is accessible through a hyperlink to a web-based program that performs predefined functions as set forth above. For example, clicking on "online catalog" would link the group member to a web page that implements an online ordering

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1 engine as described previously. Users can navigate through the various tools using conventional

2 web browser features (i.e., forward, backward, etc.). It may be desirable to implement some or all

3 of such software using server-side scripting or other similar means consistent with the system

4 configuration of FIG. 12.

5 FIG. 21 shows how environment generator 1201a can create multiple environments

6 including virtual private facilities, which can be implemented through web pages that contain

7 hyperlinks to functions available to members of each group or environment. An environment

8 definition software component 2106 implements steps 1101 through 1103 of FIG. 11 in order to

9 create one or more environments 2107. (In one embodiment, each group can also be provided

10 with a copy of an environment generator 2106 in order to create sub-groups that draw on the

11 applications and directory structure created for the group). As a user identifies group members

12 and selects functions to be provided for the environment in which the group will collaborate,

13 environment definition component 2106 stores information relating to the selected members and

14 functions in databases. Each environment can include a web page (not shown in FIG. 21) and

15 directories, tools and other applications specific for each created group.

16 Based on user selections of the type illustrated in FIGS. 13 through 19, environment

17 generator 2106 creates an environment 2107 containing one or more web pages with links to the

18 selected tools. Environment generator 2106 retrieves information from various information

19 sources including a directory of communication tools 2101 (e.g., including descriptions of tools

20 and URL/IP addresses of web applications to set up each communication tool); directory of

21 transaction engines 2102 (e.g., including descriptions of transaction engines and the URL/IP

22 addresses of web-based applications to set up each transaction engine); directory of research tools

23 2103 (similar to above); list of global data objects 2104 (e.g., a dictionary of data elements from

24 which the directory of each group can be composed); and a directory of applications 2105 (e.g., a

25 description of available applications and URL/IP addresses of pages to set up access to

26 applications).